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EDITORIAL NOTES.

THE Editor will be glad to receive "Notes and Queries" on Obstetrical and Gynæcological matters, to be published at the end of each number of the Journal. He cannot promise that all the queries will be answered, but letters sent to him in connection therewith will, if of sufficient interest, be published in part or whole. Readers who may wish for a supply of some special material can make their wants known in this column. As a start:

"Does any reader know of a case, or a 'reference' to such, in which a woman having had one Fallopian tube removed for tubal gestation and an ovum enucleated, at a later date, from the remaining tube, subsequently had an intra-uterine pregnancy?"

The Editor regrets the late appearance of the Autumn Number of the Journal. As, however, the Autumn and Winter Numbers both deal exclusively with Cæsarean section, he has deemed it preferable to combine the two under one cover for the reader's convenience, as there must be so many cross references. Moreover, the sequence and interest would both be broken if three months intervened between the publication of the earlier and later papers.

The Journal has made a new departure in printing the Catalogue of Obstetric and Gynæcological instruments in the Royal College of Surgeons, London, compiled by Mr. Alban Doran with his usual meticulous care and accuracy. The Catalogue is of considerable interest from an historical point of view, especially as illustrating the views of pathology and practice at different periods. It is likely to be of service to Museums throughout the world.

It was felt by the Directors that the cost ought not to be borne entirely by the Journal, and they have received a subsidy from the Royal College of Surgeons, which was willingly contributed.

The Directors believe that this public-spirited move will enhance the reputation of the Journal and will not be unacceptable to the Shareholders.

Indications for Cæsarean Section.

By J. M. Munro Kerr, M.D.,

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With the exception of the toxæmias of pregnancy there is at the present moment no problem in obstetrics more interesting than Cæsarean section.

The modern operation of Cæsarean section dates back to the eighties of last century. Then it was that Sänger introduced stitching of the uterine wound which brought the operation within the scope of practical obstetrics; previously the uterus had been left unstitched, and only very occasional successes were recorded. In this country the name of Murdoch Cameron deserves special mention, for shortly after Sänger's early successes he also recorded a number of cases with equally satisfactory results. It is but fitting, therefore, that in discussing Cæsarean section we should recognize their great services to obstetrics.

At the time when Sänger and Murdoch Cameron began their work on Cæsarean section practically the only accepted indication for the operation was contracted pelvis; moreover, the degree of pelvic deformity was placed much lower than it is to-day. With ever improving results the lower limit has gradually been raised, until at the present moment the border line between vaginal delivery and Cæsarean section may be placed at $3\frac{1}{4}$ in. (8.1 cm.). Another complication which was accepted early as an indication for the operation was the presence of tumours of the uterus or ovary obstructing the parturient canal, for gradually, as hysterectomy and ovariotomy became perfected, the obstetric surgeon came to appreciate the possibility of employing Cæsarean section when such tumours caused dystocia.

These two conditions, in which a distinct obstruction was present, were fairly obvious indications. Very different was the suggestion made by Lawson Tait, as far back as 1898, that placenta prævia should be dealt with by Cæsarean section. It is no exaggeration to say that his paper was a bombshell in the obstetric camp, for it must be remembered that obstetrics was, at that time, more a branch of medicine than of surgery, and was controlled by the physician.

Early in this century another indication was advanced—namely, that of severe eclampsia during the later weeks of pregnancy, and in recent years the operation has been further extended to some of the other manifestations of toxæmia of pregnancy.

Other indications have been suggested from time to time, such as accidental hæmorrhage, impacted transverse presentations, alterations in the axis of the canal from ventrofixation, extreme rigidity of the canal, and narrowness of the vagina. Indeed, there is hardly one of the graver complications of parturition which has not been mentioned as a suitable indication, in special circumstances, for Cæsarean section.

The scope of any surgical procedure or operation will always extend as the technique is improved and the mortality and morbidity reduced, and it is for us obstetric surgeons so to perfect the technique of Cæsarean section that we can extend its scope.

Before discussing the various indications for this operation, I feel it necessary to utter a word of caution regarding the danger of extending it unduly and rashly. In certain conditions, such as pelvic deformity and fibro-myomata obstructing the parturient canal, there is no doubt that Cæsarean section is indicated; in the others, however, it is not absolutely indicated, and in dealing with them discretion must be exercised, and the cases selected with discrimination. This is the great fascination of obstetric practice—the selection of the most suitable treatment. It calls for resource and judgment.

The weakness in Cæsarean section at the present time is that it leaves behind a uterus permanently injured and liable to rupture should another pregnancy occur. Until we can secure an absolutely sound uterine cicatrix the operation of Cæsarean section cannot be extended as far as many of us desire. Take, for example, the position of Cæsarean section as regards grave toxæmia, such as eclampsia. In many cases the patient is a young primigravida. At the present moment we must either sterilize this young patient—a most unfortunate procedure, for she may lose her child—or leave her unsterilized and subject to the risk of rupture at a subsequent pregnancy or parturition. Could we say to-day that the uterine wound after Cæsarean section is so sound that the possibility of rupture may practically be excluded, then we could confidently employ the operation in many cases which to-day are dealt with by the older accepted methods. But we cannot do this. It is no use shutting our eyes to the fact that Cæsarean section, performed in the manner generally favoured, leaves the uterine wall very decidedly weakened. Personally, I believe there is a solution, but this subject is outside my brief in this paper.

I would ask those who have been engaged in obstetric practice

for many years to call to mind the cases in which they have experienced great difficulty in delivering the child. I am certain that in common with myself they can recollect cases in which the results to mother and child would have been infinitely better if, instead of delivering the child with difficulty by the vagina, the obstetrician had boldly selected the operation of Cæsarean section. Many, for example, can recall, as I can, elderly primigravidæ, sometimes even young primigravidæ, with relatively rigid and narrow vaginæ, in whom the cervix dilated slowly and the presentation was often an occipito-posterior, and, finally, delivery was effected with great difficulty and considerable injury to both mother and child, possibly even with death of mother or child, or both. Cases can be recalled also of very large children and slightly underdeveloped pelves, of placenta prævia in primigravidæ, and many other grave complications.

It is all a question of the relative danger between the purely surgical procedure of Cæsarean section and the older method of force, either at the end of the forceps or by severe traction on the trunk and after-coming head, if the child is delivered breech first. One often hears the argument advanced that, as obstetric practice is largely carried out in private houses, Cæsarean section is not a suitable procedure. The longer I practise obstetrics the more convinced do I become that all deliveries should be carried out in hospitals or nursing homes. At the present moment maternal mortality and morbidity are practically the same as they were thirty or forty years ago. How can it be otherwise? In no private house can any obstetrical operation be carried out as satisfactorily as in a hospital or nursing home where there are plenty of assistants and all the surgical appliances necessary for the carrying out of any surgical procedure. Victor Bonney gave recently a graphic and amusing description of ordinary domestic obstetric practice, and pointed out the futility of hoping that satisfactory progress could be made in lessening maternal mortality as long as conditions remained as they are. Some may say that it is impossible to furnish hospital accommodation for such a large number of patients. Personally, I am convinced that the time will come when very few women indeed, and practically no primigravidæ, will be treated in their own homes. The sooner this comes the better.

Some assert that the younger school of obstetricians are too surgically inclined in their methods, but it is impossible to make the practice of obstetrics too surgical. In the management of a normal labour the first essential is surgical cleanliness. There is, of course, the danger that surgical procedures for the delivery of the fœtus may be unwisely chosen and sometimes unnecessarily employed. I have already referred to this. But what would be

the position of obstetric practice to-day if the advice of the over-cautious physician-obstetrician had been followed in the past?

Indications.

Contracted Pelvis.

Speaking generally, unless the child is very small Cæsarean section should be chosen whenever the conjugata vera is under $3\frac{1}{4}$ in. (8.1 cm.). I do not imply that it is never necessary at $3\frac{1}{4}$ in. (8.1 cm.), for even above that figure it may occasionally be indicated; nor do I mean that some other operation should not occasionally be substituted for it even at 3 in. (7.5 cm.). All I wish to imply is that when the conjugata vera is $3\frac{1}{4}$ in. one must estimate very carefully indeed the relative size of the head and the pelvis. Any other procedure than Cæsarean section should be employed only if the overlapping is slight and a certain degree of fixation of the head in the brim of the pelvis can be secured by pushing the head into the pelvic brim.

The method I employ for estimating the size of the head and the pelvis was described by me several years ago. By using the thumb I find I can estimate with accuracy the relative size of the head and the pelvis, and can predict whether the child can be brought safely through the pelvis or not.

At different times, and more especially ten or fifteen years ago, the relative merits of Cæsarean section and pubiotomy were frequently discussed. As far as I can judge the consensus of opinion is now in agreement with my personal experience that pubiotomy is relatively seldom a suitable treatment for contractions at the pelvic brim, because the gain in the conjugate is so slight for each inch of separation at the symphysis. I shall point out in a moment, however, that it is particularly suitable for certain varieties of contraction at the outlet. The cases of contraction at the brim suitable for pubiotomy are those in which the accoucheur has carefully estimated the relative size of the head and the pelvis, has erroneously come to the conclusion that spontaneous delivery will occur, has made one or two attempts with the forceps (employing moderate traction), and has failed to deliver. If pubiotomy is employed in such circumstances it gives excellent results.

For contractions at the outlet, however, as already mentioned, pubiotomy is specially suitable, because every inch of separation of the pubic bones gives a corresponding increase between the tuberosities of the ischia. Pronounced degrees of kyphotic or masculine pelvis, when the head is arrested at the outlet, are the most striking examples.

Induction of labour does not come into competition with Cæsarean section, for very rarely are the results from induction

satisfactory if the conjugata vera is under 3¼ in. Induction of labour is indicated in the particular case in which at a previous parturition the accoucheur has experienced difficulty in extracting the child with the forceps and feels that a slightly smaller child could be easily delivered; he therefore chooses induction of labour on the next occasion.

It may be taken as a general rule that Cæsarean section should always be performed if the child is alive, and craniotomy if the child is dead; but there are exceptions to both these rules. For example, in extreme degrees of pelvic deformity it may be impossible to deliver by craniotomy, even although the child is dead, while in certain cases when the child is living and when numerous examinations have been made, it is not so certain that Cæsarean section is to be selected.

Obstetricians have not come to a definite finding as to the employment of Cæsarean section in so-called septic and suspect cases. Some years ago, in nine consecutive infected cases (not simply "suspects") I took cultures from the cervix prior to the operation. In all I found numerous pyogenic organisms in mixed and in pure culture, and in seven of the cases found streptococci. I had one death from septicæmia in these cases, a mortality of 11 per cent., which is a fairly satisfactory result. I believe this result could be improved by a still more thorough disinfection of the vagina and cervix. Prior to operation I, however, employed a procedure which I believe Edge and I thought of simultaneously. The placenta was not removed through the uterine wound, but left to become detached and expelled through the vagina. So far as I can judge, at the present time this procedure and very thorough disinfection of vagina and cervix are the only means by which one can lessen the risks of infection in cases of this nature. If the placenta and membranes are dragged up through the uterine wound, which is the ordinary procedure, the raw uterine surface is streaked over with the ragged ends of the membranes, and infection of the uterine cavity is almost certain to occur.

Tumours.

The tumours which most commonly obstruct parturition are fibromyomata and ovarian cystomata. Occasionally rarer forms, such as lymphadenomata, enchondromata, and osteomata, may be encountered.

Fibromyomata.—It is unnecessary to discuss this condition in any detail, for it is generally agreed that if a fibroid tumour obstructs the passage of the child from the uterus the only procedure is Cæsarean section. On no account should be the child be dragged past the tumour. The only point requiring mention is

the fact that in a number of cases in which obstruction seems likely to occur the tumour is dragged up in the early stages of labour. I have observed this on several occasions.

In connexion with this indication our tables give summaries of eighty-eight cases, with a maternal mortality of 8 per cent. and a fœtal mortality of 19 per cent. The high fœtal mortality is interesting, and is accounted for by the fact that, in a considerable number of cases, the children were premature, and in many the tumours interfered with the growth and development of the fœtus. Glancing over the records, I am inclined to think that a few of the cases might have been dealt with by myomectomy and vaginal extraction of the child.

Ovarian Cystomata.—Cæsarean section is rarely necessary in ovarian tumours complicating labour. The treatment should be to remove the tumour and allow the child to be delivered by the natural passage. The ovarian tumour can generally be raised out of the pelvis and removed if the patient is placed in the Trendelenburg position and an assistant pushes it up from the vagina, should it be impacted in the pelvis. In very exceptional cases, in which the tumour cannot be removed, then obviously the course is Cæsarean section. I am a little surprised, therefore, at the large number of Cæsarean sections performed for ovarian tumours, for in Table VIII there are thirty-nine cases of Cæsarean section for this complication, with a maternal mortality of 10 per cent. and a fœtal mortality of 8.6 per cent.

Other tumours.—In addition to these commoner tumours, there are 2 cases of broad ligament cysts, 4 of malignant ovarian tumours, 1 of tumour of the bladder, 10 tumours of the pelvis, 9 tumours of the pelvic colon and rectum, and, lastly, 25 cases of carcinoma of the cervix. It is impossible to go into details regarding these tumours, but, taking them altogether, there is a maternal mortality of 17.6 per cent., and a fœtal mortality of 33 per cent. The deaths in this group practically all occurred with carcinoma and malignant ovarian tumours.

Eclampsia.

In Table III there are 195 cases in which Cæsarean section was performed for eclampsia, with 62 maternal deaths, which gives a maternal mortality of 31 per cent. There is no doubt that the mortality would be lower if the operation were performed earlier. Our great difficulty here is in selecting the cases suitable for this very radical procedure, for everyone who has been engaged in obstetric practice, for any length of time, must have encountered many most unpromising cases which recovered by ordinary medical and obstetrical procedures. Personally, I think that we should not

encourage the very extensive employment of the operation for this condition, although I am quite convinced Cæsarean section is advisable in a few instances, but rather concentrate on preventive treatment, for, in common with many other obstetricians, I have rarely seen a case of severe eclampsia in a woman who has been carefully attended and treated during her pregnancy. Again, this disease affects more especially primigravidæ; for example, the figures show 79 per cent. of primigravidæ. There is, further, this important point, that in a considerable number of cases the child is seriously affected. It is not as good a life as the child in contracted pelvis or placenta prævia. This is well borne out by the figures, which show a fœtal and infant mortality of 50 per cent. Unfortunately, from the records it is impossible to state how many children were premature, but undoubtedly this is an important factor, and accounts for the high death rate, although many undoubtedly succumbed to the same poison that so seriously affected the mother. The cases suitable for Cæsarean section are those in which the pregnancy is well advanced but in which there is no dilatation of cervix or attempt at labour, and when, after six hours, there is no improvement from blood-letting, intravenous saline infusion, and morphine. When the seizures occur earlier in pregnancy than the thirty-second or thirty-third week vaginal Cæsarean section is preferable.

Placenta Prævia.

The gradual acceptance of Cæsarean section as a method of treatment for certain cases of placenta prævia is particularly interesting to those of us who have been engaged in obstetric practice for a considerable number of years. As already mentioned the operation was recommended by Lawson Tait in 1898, and I can remember perfectly well how obstetricians ridiculed this suggestion.

The great argument in favour of Cæsarean section in placenta prævia is that, theoretically, the maternal mortality in uncomplicated cases should not be higher than 3 to 4 per cent., and the fœtal mortality 2 to 4 per cent. Table VI shows in 131 collected cases 13 maternal deaths, a mortality of 10 per cent., and a fœtal mortality of 15 per cent. Placenta prævia treated by the ordinary methods of plugging, version, rupture of the membranes, etc., gives a maternal mortality of about 4 to 10 per cent., and a fœtal mortality of about 40 per cent. It appears to me, therefore, that this particular complication is peculiarly suitable for Cæsarean section, and it may come to be the general method of treatment in all cases of the central or marginal varieties. I think we can put aside the lateral variety, for by rupture of the membranes and a slight separation of the lower pole of the placenta both the maternal

and fœtal mortality should be very low indeed. At the present time I am quite convinced that Cæsarean section should always be selected in the case of a primigravida with a central placenta prævia, for the plugging, manual manipulations, version, delivery of the shoulders and head, are associated with much greater danger to the mother and infinitely greater danger to the child than the more surgical procedure of Cæsarean section. Personally I have employed it on six occasions, and all the mothers and children were saved.

I have not been able to analyse the figures very completely, but am convinced that many of the maternal and fœtal fatalities could have been prevented if the operation had been performed earlier. In this particular condition it is of vital importance, if we are to admit Cæsarean section as an accepted treatment, to operate early.

Accidental Hæmorrhage.

Naturally, in discussing Cæsarean section for accidental hæmorrhage, I refer only to the graver examples of this complication. The first point to keep clearly in mind is that accidental hæmorrhage is on a different footing from placenta prævia. In accidental hæmorrhage the child need not be considered; it can practically never be saved. Consequently, we cannot advocate the employment of Cæsarean section for this complication in the interests of the child. It seems to me that we should try to find a more conservative method of treatment by which we can secure as good, or nearly as good, results. At a recent meeting in London, when the subject of ante-partum hæmorrhage was discussed, some very interesting remarks were made by different speakers, and more particularly by Gordon Ley, who pointed out the good results which he had recently secured, and which I understand continue, from keeping the patient quiet, wrapping her in hot blankets, giving her morphine, if necessary, to quieten down the circulation, and administering 1 cm. of pituitary extract as soon as labour pains started. There must, however, remain—and Ley admits this—a certain number of cases which do not respond to this treatment, and Cæsarean section is the only course open; but it is satisfactory to think that possibly the examples of this complication requiring Cæsarean section are relatively few. Into the question of the conservative operation or hysterectomy for accidental hæmorrhage, when abdominal section is necessary, I cannot enter, for that raises the whole subject of the treatment of accidental hæmorrhage. The point I want to emphasize is that it is necessary in relatively few cases, and differs from placenta prævia, in which Cæsarean section seems to be indicated in a fair number of cases. Table VII shows 20 per cent. mortality for the concealed variety.

Ventralfixed Uterus.

Many obstetric surgeons have encountered cases of this nature in which it is necessary to perform Cæsarean section. Table VIII shows fourteen cases with no maternal but two fœtal deaths. The matter calls for no discussion. The practical point is that it is inadvisable to perform ventralfixation in relatively young women. I have on one occasion, after opening the abdomen, separated the uterus from its adhesions and allowed the parturition to continue by the natural passage. This is the way, avoiding the necessity of employing Cæsarean section, which may be possible in some cases.

Interposition Operation.

This most valuable operation for cystocele should not be performed until after the menopause, as it invariably results in extreme dystocia. In the figures there are three cases in which Cæsarean section was necessary. All the mothers recovered, and all children were born alive.

Prolapse of the Cord.

I venture to think that few obstetricians of experience would advocate Cæsarean section for this condition. Although the fœtal mortality from this complication is considerable there are means of replacing the cord, even when the cervix is comparatively little dilated. Still, I would have no hesitation in performing the operation, although I have never done so, if the patient was an elderly primigravida and the cervix was rigid. The best repositor is a large roll of gauze. Table VIII shows four cases of prolapse of cord. All mothers recovered, but three of the children died—a fœtal mortality of 75 per cent.

Impacted Shoulder Presentation.

Personally, I have never employed the operation for this complication. It appears to me that it must be very seldom necessary or advisable. The slighter cases can be dealt with by deep anæsthesia and version, while the graver examples are better treated by decapitation; for by the time the labour has reached this stage the child's condition is generally far from satisfactory. It is possible, however, that occasionally a suitable case might arise in which, owing to the excessively strong uterine contractions, impaction occurred relatively early. Table VIII gives 4 cases under this heading, with 2 maternal and 2 fœtal deaths—50 per cent. for both mother and child.

Abnormal Conditions in Child.

Table VIII shows 11 cases in which Cæsarean section was performed for large size of the child: 4 for large head, 2 for occipito-posterior position, 2 for brow presentation, and 3 for impacted breech presentation—in all 22 cases, with no maternal mortality and a fœtal mortality of 2—that is, 9 per cent. As far as these conditions are concerned, I feel certain that the majority of obstetricians would admit them as justifiable indications in special circumstances. The great difficulty with them is the determining beforehand the degree of dystocia likely to be encountered. In most cases, therefore, it is advisable to allow the labour to progress some way before deciding on such a radical procedure as Cæsarean section. In some of the fœtal conditions for which Cæsarean section was performed the choice seems hardly justifiable—for example, hydrocephalus (4 cases), hydramnios (4 cases), enormous varicose veins (2 cases). Again, few of us would be prepared to accept fœtal distress as an indication, unless there was some other reason for operation.

Retraction and Contraction Rings.

Annular contractions of the uterus, in the neighbourhood of the upper or lower region of the "lower uterine segment" respectively have received considerable attention in recent years. We are all familiar with contraction of the upper region of the lower segment—"Bandl's ring" or "retraction ring"—as an indication of impending uterine rupture. But in recent years we have been able to go further, for a number of writers have drawn attention to the fact that this ring may actually act as a barrier to the passage of the child out of the uterus—as, for example, in impacted breech presentation with extended legs. There have even been a few cases in which the passage of the head has been arrested by the ring grasping the child's neck and preventing descent of the shoulders. Further, there have been a few cases recorded in which a distinct annular ring has formed at the lower region of the lower uterine segment, to which some writers have given the name "contraction ring." There are a number of cases on record in which this ring has actually prevented the descent of the forecoming head. Probably many cases of this nature will be treated by Cæsarean section in the future.

Rigidity of Cervix and Vagina.

I have placed this last in the list of indications, for, although we encounter a few cases in which Cæsarean section is indicated—for example, old cicatrices seriously obstructing the passage—there are few who advocate the employment of such radical measures as

Cæsarean section for rigidity of the cervix, even when it is extreme. Personally, I wonder if we are wise in adopting this attitude. I have seen, and many others must have encountered, primigravidæ in whom parturition was prolonged, sometimes for days, the vagina and perineum being extensively lacerated, the child bruised or dead, and the puerperium febrile. If in these cases Cæsarean section had been selected the results would have been infinitely better. Unfortunately, it is very difficult to predict the course of labour in a primigravida. In cases of this kind Cæsarean section must be delayed until we can determine what the course of the labour is likely to be. Having determined that it is to be very prolonged and likely to be associated with considerable injury to mother and child, I personally feel convinced that it would be better to transfer such a patient to a nursing home or hospital and have her operated upon by Cæsarean section. It is in this and in many other complications that the proposal of having all primigravidæ in a nursing home or hospital is of such great advantage. There the patient, with vulva prepared as if for a surgical operation, with all appliances to hand, can be treated as is deemed best, and at any time Cæsarean section can be performed with every confidence of success.

Grave Diseases Threatening the Life of the Mother.

Under this heading Table VIII shows 42 cases of cardiac disease, with a maternal and fœtal mortality of 20 per cent.; advanced pulmonary tuberculosis, two cases with no deaths; intestinal obstruction, four cases with two maternal deaths; and single cases of each of the following: diabetic coma, septicæmia, and chorea, all fatal.

I fear that in these remarks upon the indications for Cæsarean section I have been unable in many instances to lay down definite rules for guidance, but there are few problems in obstetric practice which have a single solution; in most instances there are alternatives, and the wise obstetrician is he who is not prejudiced in favour of a special procedure, but selects the particular treatment after weighing the whole matter and drawing from his past personal experience. Further, he should decide his line of action early; vacillation in obstetric practice is fatal.

Our art is ever progressing; at no period of its history has it been so virile as to-day. I am quite convinced that twenty years hence, when the youngest here have become the seniors, the accepted indications for Cæsarean section will be extended even beyond the limits suggested.

Methods of performing Cæsarean Section.

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The objects of improving the technique of an operation are to reduce its mortality and morbidity, and thereby to extend the indications for its legitimate performance. The operation of Cæsarean section has been standardized for the past forty years; in fact, the operation as almost universally performed nowadays is called the "classical" operation.

The "Classical" Operation.

The technique of the classical operation was perfected nearly forty years ago; it was in 1882 that the tentative efforts of certain obstetric surgeons culminated in the publication of Sänger's important paper on the technique of suturing the uterine incision. Prior to this the uterine incision was not sutured unless to control unusual hæmorrhage, for the surgeons of those days were fearful of leaving suture material in the peritoneal cavity. Sänger's method, with unimportant modifications, is that used by the vast majority of modern obstetric surgeons.

The classical operation has well stood the test of time, and deservedly, for it is extremely simple, and, with the general march forward of surgical technique its mortality has been reduced to such an extent that it has become a very safe operation. In consequence no operation has in modern times had its list of indications so widely, and as some consider so recklessly, extended as Cæsarean section.

Mortality.

I will first deal with the mortality of the classical operation: the safer an operation is, the more often is it performed and the greater is its list of indications. Striking testimony of this is got by comparing old with modern figures. For the old figures I have relied on the second edition of Spiegelberg's text-book, published in the year that suture of the uterus was becoming common practice.

His estimate of the mortality of the operation at the date he wrote (1882) was at least 50 per cent. With this huge mortality, the indications for the operation were correspondingly small. In fact, there was only one indication, namely, that in which delivery by the natural passages was impossible, because of absolute pelvic contraction, obstructing pelvic tumours, or carcinoma of the cervix. As regards the conditional indication for performing the operation in degrees of pelvic contraction other than the absolute (that is, in pelves with a conjugata vera above $2\frac{1}{4}$ in.), Spiegelberg writes: "The question in actual practice amounts to this: are we to sacrifice the mother for the sake of the child?" and again, "The *conditional* indication can alone be legitimate if he (the accoucheur) feels convinced that the mother is willing to sacrifice her life for the sake of her child."

How different are the modern figures and the modern indications. For these we turn to Amand Routh's well-known investigation "On Cæsarean section in the United Kingdom," published in the *Journal of Obstetrics and Gynæcology of the British Empire* for January, 1911, which gave the results of Cæsarean sections performed in the United Kingdom down to 1910. Here we see an amazing reduction in the mortality, accompanied naturally by a corresponding extension in the indications for the operation. The reduced mortality was not due to a radical change in the technique of the operation, for that had remained much the same, but to two factors of vital importance, the relative value of which is hard to estimate—namely, the general improvement in surgical technique and the fact that patients were operated on before or soon after labour had started, or in the early stages of obstetrical complications—not, as in the old days, only as a last resort when already in a dangerous state. The figures given by Amand Routh for cases of contracted pelvis operated on between 1891 and 1910 were as follows:—

Condition.	Cases.	Maternal Death.	Percentage.
1. Not in labour	245	9	3.6
2. In labour, membranes intact ...	224	5—14	2.2
3. In labour, membranes ruptured	166	18	10.8
4. Frequent examinations or attempts at delivery	64	22—40	34.3

The standard mortality of the operation *per se* is got by taking clean cases of contracted pelvis—that is, women not in labour, or in the early period of labour when no vaginal examinations have been made.

As for the indications, in great contrast to the one and only

indication of forty years ago, in Amand Routh's paper they make a formidable list of seventeen; and there is still an ever-growing list, containing all sorts of fancy and flimsy indications, such as breech presentation in primigravidæ, delayed first stage of labour, mild cases of toxæmic albuminuria, and so on.

I now come to the figures obtained by the collective investigation initiated by Professor Munro Kerr and myself. We felt that during recent years the problem of Cæsarean section had undergone considerable changes, and that accurate information was badly wanted in several directions; we therefore invited the obstetric surgeons at all the large centres in Great Britain and Ireland to send us, on tables provided for the purpose, their hospital figures for Cæsarean sections performed from the years 1911 to 1920 inclusive. Their response to our proposal has been unanimous, with the result that we are now in possession of the results of about 4,000 Cæsarean sections performed for various indications during the last ten years. Time has not allowed us to make a full analysis of these figures, but we are able to give certain results of great interest. The total number of cases in which the operation was performed for pelvic contraction is 3,374. These have not all been reported in sufficient detail to enable them to be placed in precise categories, but the following groups of cases stand out:—

Condition.	Total Cases.	Maternal Deaths.	Percentage.
A. Not in labour	1,202	19	1.6
B. Early in labour	389	7	1.8
C. Late in labour	220	22	10
D. After induction of labour	35	5	14
E. After attempts at delivery by forceps or craniotomy	107	29	*27

The cases in the above table number 1,953. Classes A, D, and E naturally gave no trouble in their selection. Class B comprises cases very early in labour, and their selection from the returns rested on such attributes as the following: "early in labour," "at onset of labour," "labour commenced," "in labour for two hours" (I have included no case in which labour had lasted for more than six hours), "labour began in hospital," "membranes intact, os two shillings," "operation of election during first stage," "some pains," and so on. Class C comprises cases very late in labour, cases at the other end of the scale to Class B; their selection depended on such notes as "membranes ruptured many hours,"

* After deducting six craniotomies the mortality for forceps alone stands at 26 deaths in 101 cases, or 26 per cent.

"prolonged labour before operation," "Bandl's ring present," "tonic contraction of uterus," "long (days or many hours) in labour, membranes ruptured," "labour advanced, and cord prolapsed," "several hours in labour, several examinations and manipulations," and so on.

The remaining 1,420 were cases in labour which either did not fulfil the requirements of Classes B and C, or in which the details given were not sufficient to enable them to be classified. The total number of maternal deaths is 139; of these 82 are accounted for in the above table; the remaining 57 occurred amongst the 1,420 unclassified cases.

The cause of maternal death is an important consideration, and was stated in 122 cases to be as follows: general peritonitis 49, septicæmia 17, sepsis 19, pneumonia 17, pulmonary embolism 8, cardiac failure 7, hæmorrhage 4, intestinal obstruction 5, acute paralytic ileus 2. It is clear that sepsis is paramount as the cause of death. In Class C 11.7 per cent., and in Class E 27 per cent., of the fœtuses were delivered dead—what one would expect after the application of forceps; two post-mortem examinations I have made in such fœtuses revealed cerebral hæmorrhage and tearing of the tentorium cerebelli. The important points brought out in this analysis are: (1) The mortality of the operation *per se* (that is, in Classes A and B) has fallen in a gratifying manner; in fact, it is only about half what it was amongst the cases collected by Amand Routh; (2) the mortality from sepsis for cases long in labour or after attempts at delivery remains almost as high as ever; in fact, the 26 per cent. mortality after forceps is a serious warning; (3) in the latter classes of case, when the operation is nearly always undertaken for the sake of the child, it is well to bear in mind that the fœtal mortality is high. The heart of a fœtus with cerebral hæmorrhage will continue to beat so long as it is still in the uterus, and, indeed, for some minutes after delivery; it is the respiration that is paralyzed.

The Defects of the Classical Operation.

Satisfactory as the classical operation is, it has certain disadvantages both in theory and in practice, and these have been coming much to the front lately. In fact, the present is a disconcerting period of unrest about Cæsarean section.

The defects of the classical operation as met with in practice are the following:—

1. The risk of sepsis in infected or suspected cases. The classical operation is not safe in cases in which infection is suspected or present—that is, when labour is advanced and the

membranes are ruptured, and when there have been many vaginal examinations or perhaps attempts to deliver by forceps.

2. The risk of rupture of the scar in subsequent pregnancy or labour. Quite apart from rupture of the scar, which is comparatively rare, the proportion of thin and defective scars which is found at subsequent operations is very high. Rupture of the scar was considered very fully last year; I found that the frequency of rupture in subsequent pregnancy or labour was 4 per cent., and that the proportion of ruptured scars to successful deliveries by the natural passages, in the series of cases I investigated was 1 to 4.[1]

3. The risk, a rare one I admit, of intestinal complications during convalescence, an example of which was the case of intestinal obstruction due to the adhesion of intestine to the uterine scar, reported by Clifford White at the recent Congress at Birmingham.

4. Adhesions between the uterine scar and intestine, omentum, or abdominal wall, which sometimes cause much difficulty in repeated operations.

Theoretically, there are certain very definite factors which militate against the healing of the uterine incision in classical Cæsarean section, and favour adhesions to surrounding structures. These were admirably dealt with by Munro Kerr at the discussion at the Royal Society of Medicine last year. They fall under three headings: (1) The structure of the uterine wall, through which the incision is made; (2) the position of the incision in the uterus, lying as it does in the general peritoneal cavity, and covered with intestines or omentum; (3) the liability of infection of the uterine wound. This is not only in possibly infected or "suspect" cases, but in clean cases also there is always a theoretical risk owing to the proximity of the uterine wound to a contaminated area—that is, the vulvo-vaginal tract.

The structure of the uterine wall through which the incision is made is a most serious disadvantage to perfect healing. It is made through a very thick layer of powerfully acting muscle. The contraction of this powerful muscle may interfere both with the accurate coaptation of the edges during suture and with subsequent healing.

Everyone knows how, during the stage of closure of the wound, the incision tends to gape transversely, and the edges are drawn apart when the uterus contracts. If the contractions are very powerful, small gaps, which become occupied by blood clot, inevitably occur between the sutures; or the sutures have to be tied

1. *Proc. Roy. Soc. Med.*, 1920, vol. xiv (Section of Obstetrics and Gynæcology), pp. 22—124.

so tightly that there is a risk of them cutting through the tissues. During the process of healing, the essential condition for the healing of divided muscle is conspicuously absent; the wound is never at rest, for the uterine contractions are always trying to drag apart its edges. Many cases have been described in which it had been necessary to reopen the abdomen for hæmorrhage, or which had come early into the post-mortem room, in which the uterine wound was found widely open owing to the sutures having cut out or, in the case of catgut, to their having become untied.

Should infection of the uterine wound occur, accompanied by the formation of granulation tissue and sloughing of the edges of the incision, healing is delayed, and an imperfect and thin scar is bound to result, owing to the retraction of the muscular edges. These imperfect scars are found of all degrees—from moderately thin scars, consisting chiefly of fibrous tissue, to extremely thin ones composed merely of peritoneum outside and endometrium or decidua inside, with little intervening fibrous tissue. The liability of such thin scars to rupture in subsequent pregnancy or labour is very great.

In the case of even mild infection the position of the incision makes adhesions between the scar and omentum, intestines or abdominal wall almost inevitable. Every obstetric surgeon has met with examples like this. Extreme examples are the cases of death from intestinal obstruction in the present series of collected cases, Clifford White's case, already referred to, and one of the five cases of ruptured scar I reported last year.

Some Points in the Technique.

It is easy enough to perform a classical Cæsarean section, but the greatest care must be taken to suture properly the uterine wound. This is the step in the operation which is apt to be done imperfectly. There must be no hurry; every suture must be inserted and tied deliberately.

Suture Methods. So long as the thick edges of the uterine incision are brought completely into apposition, and kept there throughout their whole extent during healing, it does not matter much what method is employed. The best method is, in my opinion, the usual one of passing interrupted sutures through the whole thickness of the uterine wall, except the decidua. An essential point is that the sutures should start well outside the edges of the incision, so as to include a good thickness of uterine wall. If the sutures are passed too closely outside the edges, when they are tied the edges tend to buckle and the line of the sutured wound is thinner than the natural thickness of the uterine wall. For this reason a well-curved needle is best, and the path of the needle should take such a direction as to include a wide bite of muscle.

Any method of single interrupted suture which fails to take a wide bite is not good. For example, I do not consider the method of passing the needle just beneath the peritoneal edge is to be recommended. It is true that by this means a much more accurate closure of the peritoneal edge can be obtained, but this advantage is outweighed by the disadvantage of a thin bite.

Closure of the Uterine Peritoneum. This is of great importance in preventing the leakage of possible sepsis from the interior of the uterus to the peritoneal cavity. If the usual method of interrupted through-and-through sutures which start wide of the peritoneal edge is employed, the covering of this layer by a superimposed Lembert peritoneal layer is often difficult to make perfect, especially if the uterus is contracting strongly and is well retracted. To overcome this difficulty I have adopted the following plan. I first incise the peritoneum only, throughout the length of the proposed incision. I then reflect the peritoneum for half an inch all round; this is surprisingly easy. The muscle is then incised in the usual way throughout the length of the bared area. In suturing the wound the muscular wall is sutured first; the reflection of the peritoneum allows of the needle being inserted well outside the edge of the muscle, so as to take a wide bite. After this layer is tied the reflected peritoneal edges can be accurately united, first by a running suture, and over that by a Lembert suture.

Wait for Retraction. Another point I consider of importance is to wait for complete retraction before inserting the sutures; if the wound is sutured before retraction is complete and the muscular walls are thin, the result is bound to be a scar thinner than the rest of the uterine wall, for the sutures fail to include layers of muscle fibres which during complete retraction would have slid inwards and become rearranged, adding to the thickness of the sides of the incision.

The Suture Material. As the result of my inquiry last year, as well as for theoretical reasons, I consider that silkworm gut is the best suture material, silk the next best, and catgut most unsuitable.

Most operators have their own pet method of suturing the incision, as well as other modifications in technique, but in spite of all, the classical operation remains, except for unimportant modifications essentially what it was forty years ago.

The Lower Segment or Cervical Operation.

In spite of the great merits of the classical operation, many surgeons are not entirely satisfied with it, and have devised other methods of abdominal delivery which will avoid the defects I have already mentioned as inherent to the classical. These new operations can all be grouped together under the designation of "cervical" or "lower-segment" Cæsarean section. As long ago

as the beginning of last century an operation was devised for opening the lower uterine segment extra-peritoneally through an incision above Poupart's ligament; it was revived by the American surgeon Gaillard Thomas in 1870 under the name of gastro-elytrotomy, as an alternative to the ordinary route, in order to avoid the dangers of septic peritonitis. But the operative mortality was as high or higher, and it quickly dropped out when antiseptics and Sänger's method of suture came in and brought such good results.

But the lower segment operation with a greatly improved technique has lately been revived, and its chief exponent in this country is Munro Kerr. The many methods of performing the operation can be divided into extra-peritoneal and trans-peritoneal. These I shall not discuss, but shall confine myself to the description of the simple trans-peritoneal operation.

The patient is placed in the Trendelenburg position and the abdomen is opened from the symphysis to near the umbilicus. The utero-vesical peritoneum is picked up and incised, and the bladder is dissected off the uterine wall, exposing the lower uterine segment. This reflexion of the bladder is extremely easy, more especially in cases in which the patient has been for some time in labour, and the bladder has followed the retracting uterus upwards; there should be no hæmorrhage unless the bladder is dissected down too low. The lower uterine segment is then incised. Personally, I prefer a longitudinal incision, but Munro Kerr makes it transversely. The fœtus and placenta are extracted and the uterine incision sutured; the muscle may be united either by a continuous or by an interrupted layer; over this another layer is used to close over the thick utero-vesical cellular tissue or fascia. The edges of the divided utero-vesical peritoneum are then united with a carefully placed continuous peritoneal layer.

Its Advantages.

I have employed this operation so far only nine times, and have been extremely pleased with it. Its advantages over the Classical are, I consider the following :—

1. The wound lies in a quiet part of the uterus, and is at rest during healing. There is no tendency for the edges of the wound to be drawn apart, or for gaps to be formed between the sutures. For these reasons healing occurs in more favourable circumstances than in the classical operation.

2. The uterine incision is made through a less vascular area, and bleeding from the edges is extremely slight.

3. The edges of the wound are thin; suture is therefore easier and quicker.

4. The position of the wound is such that adhesions to the intestines, omentum, or abdominal wall cannot occur; there is only

a short line of peritoneal sutures at the bottom of the utero-vesical pouch.

5. The uterine wound is covered with a thick layer of fascia and by the bladder, and perfect closure of the peritoneum can be made. For these reasons there is less likelihood of infection of the peritoneal cavity; for it is generally conceded that the source of peritoneal infection is not so much due to contamination by liquor amnii or other uterine contents during the operation as to the subsequent passage of infection from the uterine cavity between the edges of the incision. Should peritoneal infection occur the lower abdomen is more resistant than the upper.

6. The operation causes less disturbance of the abdominal contents; the intestines are never seen.

7. The scar is in a safer area for subsequent pregnancy and labour, for the lower uterine segment stretches late in labour. The stretching to which the scar is subjected is purely passive, for there is no powerful active drag upon each side of the scar, as there is in the scar of the classical operation.

8. As regards the performance of the operation, it is just as easy to a practised surgeon as the Classical; true, there is more "operating" in it—it is not done, as it were, by two strokes of the knife, as is the Classical. The more advanced the patient is in labour, the easier will the operation be and the lower will the incision lie in the lower segment and cervix; in fact, in cases of excessive retraction of the uterus, the incision will lie partly in the upper end of the vagina.

9. So far only one case of ruptured scar has been reported, and this is not a fair case, as the upper end of the incision had to be extended upwards on to the body of the uterus. At the same time it must be remembered that very few lower segment operations have been done compared to the many thousands by the classical method.

Choice of Method of Cæsarean Section.

Is it obvious that a great deal more experience and careful recording are necessary before a sound opinion can be come to about the relative merits of the classical and lower segment operations. My own future practice will be to employ the trans-peritoneal lower segment operation for all cases, except when the lower segment is hard to get at, as in cases of shortness of the abdominal cavity accompanying diminutive stature or kyphosis (when the presenting part of the fœtus is jammed down against the pelvic brim) and in fibroids. I have had no experience of the operation in cases of placenta prævia. A more moderate view would be to use the operation only in cases in which patients have been long in labour, when the operation is easier, and when infection of the wound is to be feared.

The Results of a Collective Investigation into Cæsarean Sections performed in Great Britain and Ireland from the year 1911 to 1920 inclusive, analysed by

EARDLEY HOLLAND, M.D., F.R.C.S. (Eng.), F.R.C.P. (Lond.).

AN invitation from the British Medical Association to Professor Munro Kerr and Mr. Eardley Holland to read the opening papers for the discussion on Cæsarean Section at the Annual Meeting in Newcastle in July last, seemed to provide an opportunity for organizing a collective investigation into the subject. It was felt that, during recent years, the problem of Cæsarean Section had undergone considerable changes and that accurate information was badly wanted on several points; further, that an important discussion on Cæsarean Section would have little real value unless such information were forthcoming. It was also felt that the information, to be convincing, should be on a comprehensive scale and should represent the practice and experience of British obstetric surgeons as a whole.

Messrs. Munro Kerr and Eardley Holland accordingly invited the obstetric surgeons at large centres in Great Britain and Ireland to send them, on tabular forms provided for the purpose, the details of Cæsarean sections performed by them in public hospitals from the years 1911 to 1920 inclusive.

Separate sets of printed tabular forms were provided for, I. Cases of Contracted Pelvis, II. Cases of Eclampsia and other Toxæmias of Pregnancy, III. Cases of Antepartum Hæmorrhage (Placenta Prævia and Accidental Hæmorrhage), and IV. Conditions other than I, II and III. The details and column-headings of the tables were the same for all, and will be seen on referring to the Tables of Cases published with this paper.

The following request accompanied the tables:—

"Under the heading 'Condition of patient at time of operation' please state: 1. If patient was in labour or not; 2. How long in labour before operation; 3. Stage of labour; 4. Membranes ruptured or not; 5. Number of vaginal examinations; 6. If attempts had been made to deliver with forceps or not.

"Under 'Eclampsia' please state: 1. How many fits preceded operation; 2. The amount of albumen in urine at time of operation and on discharge; 3. Time elapsing between first fit and operation; 4. How many fits followed operation and when they ceased.

"Under 'Placenta Prævia,' please state: Variety, *i.e.*, Central, or covering Os Uteri completely or only partially."

The response to the request was all but unanimous, and the details of 4,197 cases of Cæsarean section were returned on the tables.

The following is a list of the Hospitals from which returns were made, together with their respective number of cases :—

	(1) Contracted Pelvis.	(2) Eclampsia and other Toxæmias of Pregnancy.	(3) Ante Partum Hæm.	(4) Conditions other than 1, 2 & 3
S. Mary's Hospitals, Manchester ...	577	13	25	51
Glasgow Royal Mat. and Wom. Hosp.	395	7	2	13
Jessop Hosp. for Women, Sheffield ...	283	18	13	29
Liverpool Maternity Hospital... ...	274	3	27	30
Queen Charlotte's Hospital	240	53	52	53
Leeds Maternity Hospital	218	11	7	5
Birmingham Maternity Hospital ...	169	3	8	26
London Hospital	119	25	5	10
Newcastle Royal Infirmary	113	0	7	12
Guy's Hospital	85	8	6	20
Rotunda Hospital	73	3	6	14
Belfast Maternity Hospital	73	4	5	6
St. Bartholomew's Hospital	71	10	1	18
City of London Maternity Hospital ...	70	12	7	10
General Lying-in Hospital	63	10	6	5
University College Hospital	65	0	2	2
St. Thomas's Hospital	44	12	0	10
Middlesex Hospital	38	5	5	7
Royal Free Hospital	36	4	1	5
Women's Hospital, Birmingham ...	37	4	4	9
Greenock Infirmary	38	0	1	2
Bradford Royal Infirmary	32	9	4	1
Bristol Royal Infirmary	21	2	2	5
Dublin[1]	27	1	0	4
Bristol General Hospital	26	0	0	2
St. Luke's, Bradford	22	2	2	1
Birmingham General Hospital ...	20	0	0	1
Dundee Royal Infirmary	20	1	1	2
Westminster Hospital	20	1	0	3
King's College Hospital	17	3	1	5
Belfast Samaritan Hospital	16	1	0	0
Ulster Hosp. for Women and Children	15	0	0	0
Liverpool Royal Infirmary	15	1	6	7
St. George's Hospital, London ...	15	3	1	6
Cardiff Infirmary	15	0	0	7
St. Mary's Hospital, London	7	2	2	5
Great Northern Hospital, London ...	3	0	0	0
	3372	231	208	386

1. From Sir Wm. Smyly, Dr. Hastings Tweedy (cases other than those under Rotunda Hospital), Dr. Bethell Solomons, and National Maternity Hospital.

Analysis of the Tables.

The chief information sought for was the maternal mortality of the operation as performed for various indications; to ascertain the fœtal and infant mortalities was another object, though a lesser one. No doubt the tables could have been designed to yield information on other points; but in a collective investigation such as this, it is best to keep the tables as simple as possible, and to get accurate information on a few selected points, rather than to overburden them with detail. As was only to be expected, the analysis of this large material is robbed of a certain amount of completeness by the absence of details from many cases; the period of enquiry embraced the years of the war, when staffs were short and note-taking was necessarily imperfect. Nevertheless, the number of cases is so great that the enquiry has yielded all the information it was designed to.

Full tables are given in this paper of the following groups of cases: I. Contracted Pelvis, (*a*) after attempted delivery with forceps or by craniotomy, (*b*) after induction of labour, (*c*) all lower uterine segment operations, (*d*) all cases of Cæsarean-hysterectomy, (*e*) all fatal cases; II. All cases of Eclampsia and other Toxæmias of Pregnancy; III. All cases of Placenta Prævia.

I. Contracted Pelvis.

Maternal Mortality.

The number of cases in which the operation was performed for pelvic contraction is 3,372, with a maternal mortality of 139, or 4.1 per cent. But the crude mortality-rate for the whole series does not yield much information; it is necessary to place the cases into categories. They have not all been reported in sufficient detail to enable them to be placed in precise categories, but the following important groups of cases stand out: A. Not in labour; B. Early in labour; C. Late in labour; D. After induction of labour; and E. After attempts at delivery by forceps or by craniotomy.

The maternal mortality for these groups of cases is shown in the following table (30 cases of Cæsarean hysterectomy are included):

Table I.

Maternal mortality: contracted pelvis.

	Total Cases.	Maternal Deaths.	Per-centage.
A. Not in labour	1202	19	1.6
B. Early in labour	389	7	1.8
C. Late in labour	220	22	10
D. After induction of labour	35	5	14
E. After attempts at delivery by forceps or craniotomy	107	29	27

Classes A, D and E are defined enough, and naturally gave no trouble in their selection. Class B comprises cases *very* early in labour, and their selection from the tables rested on such attributes as the following: "At onset of labour," "labour commenced," "early in labour," "in labour for two hours" (no case has been included in which labour is stated to have lasted for more than six hours), "labour began in hospital," "membranes intact, os two shillings," "operation of election during first stage," "some pains," and so on. Class C comprises cases *very* late in labour, cases at the other end of the scale to Class B; their selection depended on such notes as, "membranes ruptured many hours," "prolonged labour before operation," "Bandl's ring present," "tonic contraction of uterus," "long (days or many hours) in labour, membranes ruptured," "labour advanced, and cord prolapsed," "several hours in labour, several examinations and manipulations," and so on.

The cases in the above table number 1,953, and account for 82 of the 139 maternal deaths. The remaining 1,419 cases were cases in labour which either did not fulfil the requirements of Classes B and C, or in which the details given were not sufficient to enable them to be classified.

Among the 107 cases in Class E, it should be stated that unsuccessful attempts to deliver by craniotomy had followed failure with the forceps in six cases, with three deaths. This gives a corrected mortality, after forceps *alone*, of 25.7 per cent. (26 deaths in 101 cases).

Among the 35 cases in Class D, the forceps was used in one, and this was a fatal case (included also under Class E).

The important points that are brought out by this analysis, so far, are (1) the mortality of the operation *per se* (*i.e.*, in Class A) has fallen in a gratifying manner; in fact it is only half what it was among the cases collected by Amand Routh up to 1910; (2) the mortality after cases long in labour, or after attempts at delivery remains as high as ever. The 27 per cent. mortality after attempts at delivery is a serious warning; and furthermore, as will be shown in a later section, *the fœtal mortality of cases when forceps has been tried amounts to 27 per cent., and the early mortality of the infants who survive delivery is nearly 11 per cent.*

Causes of Death.

The cause of death is stated in 122 of the 139 fatal cases:—

General peritonitis	49
Sepsis	16
Septicæmia	10
Septic absorption	3

Abscess in utero-vesical pouch, intestinal obstruction	1
Pulmonary embolism	8
Lobular pneumonia	5
Lobar pneumonia	2
Pneumonia	10
Chronic bronchitis and cardiac failure	1
Intestinal obstruction	4
Acute paralytic ileus of stomach and intestines	2
Hæmorrhage	3
Hæmorrhage and shock	1
Collapse	2
Exhaustion	2
Cardiac failure	1
Death under anæsthetic	1
Fatty heart, death under anæsthetic (post-mortem Cæs. Sect.)	1
	122

In cases not in labour (Class A) the cause of death among the 19 fatal cases was: General peritonitis 9, sepsis 1, pneumonia 3, pulmonary embolism 3, chronic bronchitis and heart failure 1, intestinal obstruction 1, and acute paralytic ileus 1.

The Lower Segment Operation.

There were 33 cases in which the uterus was incised through the lower uterine segment. They will be found in full in a separate table, where they can be studied in detail; 12 of them were "extra-peritoneal" operations, with 4 deaths, and 20 were "trans-peritoneal" operations ("lower uterine segment"), with one death.

Cæsarean Hysterectomy.

There were 46 cases of Cæsarean hysterectomy, with 8 deaths (a fatal case of hysterectomy of the unopened uterus is not included). They are placed with full original details, in a separate table. It is a pity that the indication for the hysterectomy is stated in so few cases: in 19 it is given as follows:—

Fibromyoma of uterus	5
Scars of former Cæs. sect. found thin and weak	3
Spontaneous rupture of former scar	1
Rupture of uterus	3
Adhesions after former Cæs. sect.; wall flabby	1
Hæmorrhage and inertia	1
Hæmorrhage following excision of tubes to sterilize	1
Uterus septic, or "looked infected"	2
Old abscess found in uterine wall from former Cæs. sect.	1
Tuberculous abscess found pointing in pelvis; vaginal drainage	1

Of the 8 fatal cases, 3 are included in the above list of indications, viz., a case of ruptured uterus (after craniotomy), the case of hæmorrhage and inertia, and the case with an abscess in the uterine wall from a former Cæsarean section. The 5 other fatal cases are as follows: one not in labour, death from peritonitis; one after the membranes had been ruptured for 24 hours; one, very late in labour, death from peritonitis; one, after forceps had failed, death from sepsis; and one about which there are no details.

As 30 of these cases of Cæsarean hysterectomy have been included in Table I of Maternal Mortality made up of Classes A, B, C, D and E, they should, for the sake of strict accuracy, be taken out of it, and the necessary alterations in the table made. These 30 cases are distributed in classes as follows: Class A, 13 cases with one death; Class B, 3 cases with no deaths; Class C, seven cases with two deaths; Class D, no cases; and Class E, 5 cases (4 forceps, 1 craniotomy) with two deaths (one after forceps and one after craniotomy). The deletion of these cases slightly reduces the maternal mortality for all classes.

TABLE II.

Corrected Maternal Mortality after deleting Cæsarean Hysterectomy.

Condition.	Total Cases.	Maternal Deaths.	Per-centage.
A. Not in labour	1289	18	1.4
B. Early in labour	384	7	1.8
C. Late in labour	213	20	9.4
E. After attempts at delivery by forceps or craniotomy	102	27	26.5

Among the above 102 cases in Class E, there are 5 cases of craniotomy with two deaths. When these are deleted, *the true mortality of Cæsarean section after the application of forceps alone is given; this is, 25 deaths in 97 cases, or 25.8 per cent.*

Fœtal and Infant Mortality.

As Cæsarean section is an operation performed largely, sometimes solely, in the interests of the child, it is of great interest to analyze, in this large series of cases, both the fœtal mortality and the mortality of the surviving infants during their stay in hospital. Among the 3,373 operations for contracted pelvis were 19 cases of twin pregnancy, bringing the number of children up to 3,392. After deducting six cases of craniotomy and eight cases in which no note of the child is recorded, there are left for consideration 3,378 children. Of these:

3,125 left the hospital alive,
122 were born dead,
131 died in hospital.

The fœtal mortality is therefore 3.9 per cent., and the infant mortality among the survivors is 4.2 per cent.

This crude statement of mortality gives very little information; as in the case of the maternal, so in the cases of the fœtal and infant mortality of the operation, the cases must be placed in categories. This has been done in the following table, exactly the same classes being used, and, naturally, exactly the same number of operations being involved, as in the Table of Maternal Mortality (with the exception that craniotomies are not included under Class E):—

TABLE III.

Contracted Pelvis: fœtal and infant mortality.

	No. of Children.	Fœtal Deaths.		Infant Mortality of Survivors.	
			Per cent.		Per cent.
A. Not in labour	1208	10	0.8	47	3.9
B. Early in labour	393	4	1	20	5
C. Late in Labour	219	25	11.4	10	5
E. After attempts at forceps delivery	100	27	27	8	10.9

Class D has not been included in this analysis because the fœtuses were all premature.

This analysis brings out two important points:

(1) The high fœtal death-rate when the operation is performed very late in labour.

(2) The surprisingly high fœtal death-rate when the operation is performed after failure to deliver with forceps.

(3) The high infant mortality-rate in the latter class of case.

The next step is to seek out the chief causes of fœtal and infant mortality in these cases. Unfortunately, very little information is available, owing to the incompleteness of the records sent in.

(1) *Fœtal Death.*

Class A, 10 cases. No comment is made in five; in one prematurity is given as the cause of death; in one the fœtus was a "monster"; in one it was macerated; in one it had a congenital malformation of the heart; and in one the mother had threatened eclampsia.

Class B, 4 cases. No comment in any.

Class C, 25 cases. No comment in twelve; prolapsed cord in four; tonic contraction of the uterus in three; transverse presentation and tonic contraction in one; very late in labour (4 and 5 days) in four; twins (one alive); Bandl's ring in one.

Class E, 27 cases. No comment in 22; fœtus much injured by forceps in two; fœtus had fractured skull in one; prolapsed cord in one; transverse presentation almost tonic contraction in one.

(2) *Infant Mortality.*

Class A, 47 cases. Anencephaly in one; hydrocephalus in one; congenital heart in one; patent ductus arteriosus in one; duodenal stenosis in one; convulsions in two; basal meningitis in one; influenza in one; persistent vomiting in one. Prematurity is given as the cause in five (including a case of twins); in three of these an error had been made about the duration of pregnancy, owing to the patient having given incorrect menstrual dates. Of the remainder, no comment is made in eleven; one lived a few minutes; seven lived a few hours; nine lived from 2 to 7 days and four lived from 10 to 28 days.

Class B, 20 cases. Prematurity in two; hydramnios and premature twins in one; atelectasis in one. Four cases were associated with severe puerperal sepsis in the mother, including a case of bilateral mammary abscess. Four lived a few hours, and no special comment is made in the remainder.

Class C, 10 cases. Two lived a few minutes; one lived a few hours; one died of pneumonia and one of wasting; no comment in the remainder.

Class E, 8 cases. One died on the third day from cerebral hæmorrhage; one case of congenital syphilis; one lived a few minutes, and one a few hours. No comment is made in the rest.

II. Eclampsia and other Toxæmias. (Table XIV.)

There were 231 cases, as follows:

A. Eclampsia, 196 cases.
B. Other Toxæmias, 35 cases.

A. Eclampsia.

Maternal Mortality.

In 196 cases there were 63 maternal deaths; after deducting one case of post-mortem Cæsarean section, the maternal mortality stands at 62 deaths in 195 cases, or 31.8 per cent. Again deducting five cases of vaginal Cæsarean section with one death, *the maternal mortality of abdominal Cæsarean section for eclampsia works out at 61 deaths in 190 cases, or 32 per cent.*

The question that immediately arises is whether this high mortality is due to the selection of only the severest types of eclampsia for Cæsarean section. This point was particularly aimed at in this investigation, and it was hoped that the gravity of the case might be appraised by obtaining statements as to the number of

fits preceding operation, the time elapsing between the first fit and the operation, and the persistence of fits after the operation. This plan assumed, of course, that the severity of the case depended on the number of fits, which is open to question; the great uncertainty of the ultimate course of a case of eclampsia when first seen and the difficulty in making a prognosis as to recovery are well known. As all the cases of eclampsia and other toxæmias of pregnancy are printed in full, as returned in the tables, in Table XIV, such conclusions as the recorded details permit may be drawn by anyone. Certain points have been worked out and are displayed in Table IV; as regards the frequency of fits before operation, it will be noticed that the mortality is two and a half times greater when they were numerous than when they were few (by numerous is meant more than six fits, or occurring oftener than one per hour if they were less than six).

TABLE IV.[1]

	Frequency of Fits before Operation.						Stage of Labour at Operation.						Additional Indication for Operation.			
	*Numerous	Mortality	Few	Mortality	No Record	Mortality	Not in Labour	Mortality	In Labour	Mortality	No Record	Mortality	Contracted Pelvis	Ovarian Cyst	Slight A.P.H	Transverse Lie
Eclampsia—																
(A) Abdominal Route	74	31	46	8	70	22	73	23	21	9	96	29	7	2	2	—
(B) Vaginal Route ...	2	1	2	—	1	—	5	1	—	—	—	—	—	—	—	—
Other Toxæmias—																
(Abdominal Route) ...	—	—	—	—	—	—	19	6	7	—	9	1	—	—	—	1
Total	76	32	48	8	71	22	97	30	28	9	105	30	7	2	2	1

*Numerous = more than six, or occurring oftener than one per hour if less than six.

	Additional Operation performed				Condition *re* Fits after Operation.					
	Nephrotomy	Hysterectomy	Ovariotomy & Removal of Appendix	Decapsul. Left Kidney	Recurrence	Mortality	No Recurrence	Mortality	No Record	Mortality
Eclampsia—										
(A) Abdominal Route	2	1	1	—	43	17	38	7	109	37
(B) Vaginal Route ...	—	—	—	—	2	1	2	—	1	—
Other Toxæmias—										
(Abdominal Route) ...	—	—	—	—	—	—	—	—	—	—
Total	2	1	2	1	45	18	40	7	110	37

1. For the compilation of this table the author is indebted to Dr. MacIntyre of Glasgow.

As regards the cause of death, notes are made in 37 cases. In 20 of these the severity of eclamptic toxæmia is indicated, *i.e.*, 5 died comatose, 6 with hyperpyrexia, 3 from "severe toxæmia," 1 from "eclampsia," and in 4 post mortem examination revealed severe necrotic changes in the liver, kidneys and other organs. In the remaining 17, more precise causes of death are given: general peritonitis in 1, pulmonary embolism in 1, pneumonia in 5 (broncho-pneumonia in 2, hypostatic pneumonia in 1, pneumonia in 2), œdema of lungs in 2, heart failure in 2, shock in 1, suppression of urine in 3, cerebral hæmorrhage in 1, and persistent diarrhœa in 1.

The interval elapsing between operation and death is noted in 54; 30 died within the first 24 hours, 14 between the second and fourth days, 9 from the fifth to twelfth days, and one after some weeks.

As regards the parity of the patients, 147 (75 per cent.) were primigravidæ, 26 had had from two to five children, 9 had had from six to nine children, and in 14 no record is given.

Fœtal and Infant Mortality.

Among the 196 cases of eclampsia, there is no note of the child in three. Among the remaining 193 cases there are 206 children for consideration, including 13 twin-pregnancies. The fœtal and infant mortality is displayed in Table V (which includes also the mortality among the other toxæmias).

TABLE V.

	No. of Cases.	No. of Children.	Dead Births.	Died Later.	Left Hospital Alive.
Eclampsia	193	206	66	37	103
Other toxæmias	34	39	6	6	27

The total mortality of the children is 50 per cent.; *the fœtal mortality-rate being 32 per cent., and the infant mortality-rate among the survivors being 26 per cent.*

All the fœtuses delivered by vaginal Cæsarean section were very premature and were born dead.

The details given in the tables are too scanty to enable conclusions as to the causes of fœtal or infant mortality to be drawn. The state of maturity of the fœtus is given in only 32 of the dead-births. Eight were mature or of over 36 weeks intra-uterine age; 24 were premature, comprising one fœtus of five months, 3 of 24 weeks, 6 of 26 weeks, 3 of 30 weeks, 7 of seven months and 4 of eight months. Amongst the children who died later, the date of pregnancy is given in only nine; two were from eight to eight-and-a-half months, two of from seven to seven-and-a-half,

two from 36 to 38 weeks, one of 28 weeks and one of 26 and one of 24. The twin pregnancies were accompanied by a high mortality-rate, the 13 twin pregnancies showing the following pairing: G., G. 3; G., D. 2; D., D. 3; D., D.B. 1; D.B., D.B. 4; *i.e.*, out of 26 twin-children, 9 were born dead and 9 died later. Prematurity is obviously the prime cause of the fœtal and infant mortality.

B. OTHER TOXÆMIAS OF PREGNANCY.

The 35 cases classed under this heading consisted of the following groups:—

Albuminuria of pregnancy	29 cases
Chronic nephritis	2 „
Advanced nephritis	1 „
Hyperemesis gravidarum	2 „
"Severe toxæmia"	1 „

Albuminuria of pregnancy. Among these 29 cases, the maternal mortality is 6, or 20 per cent. Two of the patients had post-operative eclamptic convulsions (Nos. 129 and 172 in Table XIV). They have not been classified as cases of eclampsia because there were no convulsions before operation, and they were operated on as cases of albuminuria of pregnancy; both the mothers died, and both the children lived.

As regards the fœtal and infant mortality, the number of children to be considered is 32 (there were four twin pregnancies, and no note of the child is given in one); 4 of the children were born dead, 4 died later and 24 left the Hospital live.

Chronic nephritis. Both the mothers and both the children lived.

Advanced nephritis. The mother lived and the child died later.

Hyperemesis gravidarum. One of the mothers died; two of the children were born dead (twins) and the other died later.

Severe toxæmia: Variety not stated. Both mother and child lived.

In Table V is displayed the fœtal and infant mortality of this mixed group as a whole.

III. ANTEPARTUM HÆMORRHAGE.

There were 208 cases of antepartum hæmorrhage, comprising 139 cases of placenta prævia, 66 cases of "accidental" hæmorrhage, and 3 cases of free intraperitoneal hæmorrhage, in two of which the bleeding came from a ruptured vein on the wall of the uterus, and in the third the source of bleeding was not found.

A. Placenta Prævia (Table XV).

Maternal Mortality.

For the purpose of studying the maternal, fœtal and infant mortality the cases have been divided into (1) complete or central; (2) incomplete, partial, marginal or lateral; and (3) "placenta prævia," those cases in which the variety was not specified. There were 16 maternal deaths in the whole group of 139 cases, making a maternal death-rate of 11.5 per cent. Dividing the cases into groups, the mortality is as follows:—

Table VI.

Maternal Mortality of Placenta Prævia.

(1) Complete and central, 78 cases, 11 deaths, or 14 per cent.
(2) Incomplete, etc., 43 cases, 4 deaths, or 9.3 per cent.
(3) "Placenta prævia," 18 cases, 1 death.

Causes of maternal death. Four died from general peritonitis; two died of "sepsis"; three died of hæmorrhage or shock, or both; one died after an operation for intestinal obstruction, on the fifth day; one died on the second day from acute dilatation of the stomach; one died of heart-failure on the fourth day; one was moribund at the time of operation; in one there was no note of the cause of death. Two other patients died from causes which cannot be ascribed either to the operation or to placenta prævia; one was operated on in diabetic coma, from which she never recovered; and the other had a combination of placenta prævia with severe "concealed accidental hæmorrhage," (Case No. 193 in Table XV). These cases should be deducted, giving a mortality of 14 cases in 137, or 10 per cent.

Cæsarean hysterectomy was performed five times, with no fatality.

Fœtal and Infant Mortality.

The number of children to be considered is 138 (no note of the child in one case, and twin-pregnancy in one). The number of fœtuses born dead is 10, giving a fœtal mortality of 7 per cent. The number of children who died during their stay in Hospital is 29, representing an infant mortality of 22.3 per cent. amongst the 128 children who survived birth.

The very low fœtal mortality is, of course, extremely flattering to Cæsarean section; the mortality associated with the more conservative methods of version or hydrostatic bags is given by most observers as from 40 to 60 per cent.

Coming now to the consideration of the causes of death among the children, there is very little information. Among the dead-births no comment is made in 8; in one the fœtus was macerated,

and in one death was due to retro-placental hæmorrhage (the case of "concealed accidental" hæmorrhage). Prematurity appears as the most prominent cause of infant mortality.

B. Accidental Hæmorrhage.

There are 66 cases, of which 58 are described as being of the "concealed" or "concealed and revealed" varieties (59 of the former and 9 of the latter), most of them of a severe type, many of them accompanied by albuminuria, and some of them by other symptoms of a severe toxæmia; the other 8 cases are designated simply "accidental hæmorrhage" and are cases of a much milder type.

Maternal Mortality.

Among the whole group of 66 cases there were 18 maternal deaths, giving a maternal mortality of 27 per cent. Among the 58 cases of "concealed" and "concealed and revealed" hæmorrhage, there was a mortality of 17 cases, or 29 per cent.; and among the 8 cases of "accidental" hæmorrhage the mortality was one case, or 12 per cent.

The relative mortalities of simple Cæsarean section and Cæsarean hysterectomy must now be considered.

Table VII.

Maternal Mortality of Accidental Hæmorrhage.

(i) *The whole group.*

Cæsarean section: 36 cases, 4 deaths, mortality 11 per cent.
Cæsarean hysterectomy: 30 cases, 14 deaths, mortality 46.6 „

(ii) *The "concealed" and "concealed and revealed" cases.*

Cæsarean section: 30 cases, 4 deaths, mortality 13 per cent.
Cæsarean hysterectomy: 28 cases, 13 deaths, mortality 46 per cent.

(iii) *The eight "accidental hæmorrhage" cases.*

Cæsarean section: 6 cases, no deaths.
Cæsarean hysterectomy: 2 cases, one death.

The striking point that comes out here is that the mortality after Cæsarean hysterectomy is about four times as great as after simple Cæsarean section. Is this to be explained by the fact that Cæsarean hysterectomy was done for the severest cases, and simple Cæsarean section for the less severe ones? The details given in the tables do not support this; so far as can be judged from notes about the degree of collapse or anæmia or toxæmia among the

cases of concealed accidental hæmorrhage, there appears to be a fairly equal distribution of the very severe cases between the Cæsarean hysterectomies and the simple Cæsarean sections. Occasionally a special reason is given for the removal of the uterus, such as infiltration of the uterine wall or broad ligaments with blood, failure of the uterus to contract or persistence of hæmorrhage after insertion of the sutures.

Fœtal and Infant Mortality.

The fœtal mortality among the "concealed" and "concealed and revealed" cases is, of course, as would be expected, extremely high, viz., 86 per cent. Cæsarean section cannot save the fœtus, nor is it designed to. The wonder is that eight children (of whom three died very soon) were delivered alive. Among the eight cases labelled "accidental hæmorrhage," three were born dead, and two of the five survivors died later.

C. Intraperitoneal Hæmorrhage.

These three cases do not strictly conform to the obstetrical definition of antepartum hæmorrhage. They were cases of profuse intraperitoneal hæmorrhage; the source of the bleeding in one was a ruptured vein on the posterior wall of the uterus, in another was from a ruptured vein on the peritoneal surface of the lower uterine segment, and in the third the source of the bleeding could not be found. One patient was in labour and one not. Cæsarean hysterectomy was performed in all three cases; one mother died, and all the fœtuses were dead-born.

IV.—Conditions other than I, II and III.

The number of cases in this group is 366. The indications for operation are so many and various that a satisfactory classification is not easy to make. The following plan has been adopted:—

I.—Conditions causing, or likely to cause, obstructed or prolonged labour: 259 cases.
  A. In the pelvic viscera or birth-canal.
  B. In the fœtus.
II.—Grave diseases threatening the mother: 61 cases.
III.—Fœtal states, other than those included in I. *B*: 20 cases.
IV.—Rupture of the uterus: 9 cases.
V.—Miscellaneous indications: 17 cases.

These indications, arranged according to the above plan, are displayed in detail in Table XI.

TABLE XI.

I. *A*, 226 cases.

(*a*) Tumours.

(1) Fibromyoma of the uterus	88
(2) Ovarian Tumours	41
(3) Broad ligament cysts	3
(4) Tumours of the bony pelvis	10
(5) Carcinoma of the cervix	25
(6) Carcinoma of the rectum and colon	8
(7) Vaginal fibroid	1
(8) Sarcoma of vagina	1
(9) Tumour of the bladder wall	1
(10) $4\frac{1}{2}$ months' tubal abortion	1
(11) Unclassified pelvic tumours	4

(*b*) Alterations in the axis of the birth-canal due to ventral-fixation, ventral-suspension, and interposition operations.

(1) Ventral-fixation and ventral-suspension	16
(2) Interposition operation	3

(*c*) Narrowing of the birth-canal due to vaginal and perineal repair operations ... 4

(*d*) Contraction- or retraction-rings of the uterus during labour ... 3

(*e*) Congenital malformations of the uterus or vagina.

(1) Bicornute and unicornute uterus	4
(2) Septate vagina	4

(*f*) Rigidity or stenosis of the cervix or vagina.

(1) Cicatricial bands of the cervix and vagina	1
(2) Atresia of the cervix	1
(3) Absence of cervix; previous operation	1
(4) Occlusion of os uteri; previous operation	1
(5) Rigidity of cervix; long in labour	3
(6) Atresia of vagina	1
(7) Narrow vagina in elderly primigravida	1

I. *B*, 33 cases.

(*a*) Excessive size of fœtus or of fœtal head ... 16

(*b*) Malpresentations.

(1) Occipito-posterior presentation	2
(2) Brow presentation	3
(3) Breech presentation, impacted	3
(4) Transverse presentation	5

(*c*) Malformations—Hydrocephalus ... 4

II. 61 cases.

Grave diseases threatening the mother.

(1) Cardiac disease	40
(2) Pulmonary tuberculosis	2
(3) Bronchitis and dilated heart	1
(4) Asthma and bad general condition	1
(5) Pleurisy	1
(6) Uræmic fits	1
(7) Chronic nephritis verging on coma	1
(8) Diabetic coma	1
(9) Large goitre	1
(10) Cerebral hæmorrhage, cerebral tumour ...	1
(11) Encephalitis lethargica	1
(12) Epilepsy and slight antepartum hæmorrhage ...	1
(13) Chorea	1
(14) Septicæmia	1
(15) Enormous varicose veins	1
(16) Persistent vomiting; no intestinal obstruction	1
(17) Intestinal obstruction	5

III. 20 cases.

Conditions of the fœtus other than under I.*B*.

(1) Former repeated death of fœtus during labour	10
(2) Fœtal distress	5
(3) Prolapse or presentation of umbilical cord ...	2
(4) Hydramnios	2
(5) Missed labour	1

IV. 9 cases.

Ruptured uterus	9

V. 17 cases.

Miscellaneous indications.

(1) Cicatrization from former operation for pelvic cellulitis	1
(2) Severe pain due to adhesions following removal of suppurating appendix	2
(3) Extreme adduction of thigh from old hip-disease	1
(4) Ankylosis of both hip-joints	1
(5) Appendicitis and slight disproportion	1
(6) Septic vaginal discharge ("prohibiting forceps") and slight disproportion	1
(7) Septic vaginal discharge and shoulder presentation	1

(8)	Pendulous abdomen, sacculation of uterus ...	1
(9)	Large umbilical and ventral herniæ	3
(10)	The mother aged only 14	1
(11)	Anus vaginalis	1
(12)	Recto-vaginal fistula	1
(13)	Vesico-vaginal fistula	1
(14)	Primary uterine inertia, non-retraction of uterus	1

GROUP I.*A*. (*a*) *Tumours.*

(1) Fibromyoma of the uterus. Among the 88 cases, 9 mothers died, giving a maternal mortality of 10 per cent. In 42 cases, hysterectomy was performed, with 4 deaths; in 23 cases, myomectomy, with 3 deaths; and in the remaining 23, simple Cæsarean section, with 2 deaths. In 42 of the cases, the operation was noted as being performed during obstructed labour. In 30 cases the patient was noted as being not in labour, but in most of these the tumour, or tumours, was in such a position as certainly to obstruct labour. The number of dead-born fœtuses was 11, and the number of children dying later was also 11. The details of the 9 fatal cases are as follows: (i) obstructed labour, multiple fibroids, one in lower uterine segment; Cæsarean section and myomectomy. Death from post-operative hæmorrhage. (ii) Fibroid obstructing labour, placenta prævia. Death 4 days later from general peritonitis. (iii) Sloughing fibromyoma of the cervix, not in labour; Cæsarean section and panhysterectomy. Death one month later from prolonged sepsis. (iv) Degenerating fibromyoma; not in labour; Cæsarean section and subtotal hysterectomy. Died on second day from septicæmia. (v) Not in labour; lower uterine segment operation performed, followed by removal of tumour size of fœtal head by myomectomy. Reactionary hæmorrhage occurred for which subtotal hysterectomy was performed. The patient died 4 hours after the subtotal hysterectomy and 52 hours after the Cæsarean section. (vi) Multiple fibromyomata, $3\frac{1}{2}$ months pregnant, retention with overflow and cystitis due to impaction. Myomectomy, fœtus removed through same incision; death in six days from double infective pyelitis. (vii) Not in labour, condition apparently good, but tumour infected with B. Welchii. Sepsis from gas gangrene bacillus. (viii) Cervical fibromyoma obstructing labour; forceps applied twice before admission; Cæsarean section and subtotal hysterectomy. Death from general peritonitis. (ix) Admitted with arm and tumour protruding at vulva; part of tumour had been enucleated; Cæsarean section and hysterectomy. Died 8 hours later.

Of the 11 dead-born fœtuses, one was anencephalic, and nine were from cases of obstructed labour; the remaining one was from

a case of degenerating fibromyoma, in which the mother died on the second day (fatal case iv above).

(2) Ovarian Tumours. The 41 cases of ovarian tumour are made up of the following varieties: 15 dermoid cysts, 13 "cysts," 4 fibromata and "solid tumours," 4 "ovarian tumours," 4 carcinomata and 1 sarcoma. The maternal deaths in the whole series numbered 7 cases, the fœtal deaths 4 cases, and the infants' 1 case.

In assessing mortality is it not fair to include the five malignant tumours, which accounted for two maternal and one fœtal death. The maternal mortality among the 36 innocent tumours thus works out at 5 cases, or 14 per cent. It is presumed that the tumour was removed in all cases, though in 5 cases no note of this is made. In 3 cases it is noted that the patient was not in labour; in all other cases labour was obstructed.

The details of the seven fatal cases are as follows:—(i) dermoid cyst, in labour, Cæsarean section and removal of cyst. (ii) Ovarian cyst obstructing labour, Cæsarean section and removal of cyst, death from septic peritonitis. (iii) Carcinomatous growths in ovaries and pelvis, secondary to advanced carcinoma ventriculi; obstructed labour at 34 weeks, transverse presentation; Cæsarean section only. Death on the 6th day of asthenia, no peritonitis. (iv) Sarcoma of ovaries with marked secondary growths in the pelvis; the patient was very ill and died the following day. (v) Ovarian cyst obstructing labour, forceps had been applied; Cæsarean section and removal of the cyst. Died on the 5th day. (vi) Ovarian cyst (pseudomucinous) obstructing labour; Cæsarean section and removal of the cyst. Died 21 days later from septic bronchopneumonia after prolonged pyrexia which began on second day. (vii) Ovarian cyst obstructing labour, forceps applied before admission; Cæsarean section and removal. Death from albuminuria and suppression of urine.

(3) Broad ligament cysts. No maternal or fœtal mortality.

(4) Tumours of the bony pelvis. These 10 cases were as follows: 3 cases of osteoma of the pelvis, 3 of pelvic sarcoma, one of fibroma, 1 extra-peritoneal cyst of the posterior pelvic wall, 1 tumour of the sacrum, and 1 sacro-iliac tumour. There was no maternal, fœtal or infant mortality. Five were cases of obstructed labour, and five were not in labour. The extra-peritoneal pelvic cyst was removed, one fibrosarcoma was partially removed, and subtotal hysterectomy was performed in a case of extensive pelvic sarcoma.

(5) Carcinoma of the cervix. Among the 25 cases were 6 maternal deaths; there were 4 dead-births, and 10 children died later. In 9 cases Cæsarean section was followed by radical abdominal panhysterectomy (Wertheim's operation); in one case the growth was noted as being in an early stage and radical operation

was postponed; in the remaining 15 cases the growth is noted as being inoperable. In the latter 15 cases, simple Cæsarean section was performed in 6, and Cæsarean section followed by subtotal panhysterectomy in 9. The maternal mortality was distributed as follows: Cæsarean section and Wertheim's hysterectomy, 9 cases with 2 deaths; Cæsarean section and hysterectomy, 9 cases (all inoperable) with no deaths; simple Cæsarean section, 7 cases (all inoperable but one) with 4 deaths. Of the Wertheim operations, 4 were in labour and 5 not; three were performed at seven and one at eight months' gestation; all the children were born alive but five died later, three of prematurity. Of the inoperable cases, all but 7 are noted as being in labour.

The details of the fatal cases are as follows: (i) Advanced carcinoma, in labour 24 hours, Cæsarean section, death on 10th day from intestinal obstruction; fœtus born dead. (ii) Advanced carcinoma, not in labour at $7\frac{1}{2}$ months' gestation; Cæsarean section followed by Wertheim's hysterectomy; died next day, twins died later. iii) Cæsarean section followed by Wertheim's hysterectomy; died same day of post-operative shock. (iv) Extensive carcinoma of cervix, 6 months' gestation, severe hæmorrhage; simple Cæsarean section. Death from general peritonitis in 4 days. (v) Advanced carcinoma of cervix, not in labour, cervical growth gouged out, simple Cæsarean section. Died in three days from shock and general weakness. (vi) Inoperable carcinoma of cervix, in labour; simple Cæsarean section. Developed eclampsia and died in a fit on fifth day.

6. Carcinoma of the rectum and colon. There was no maternal death amongst these 8 cases; two children died later from prematurity. In one case colotomy was performed at the time of operation, and in two cases colotomy had already been performed a few months previously. Labour was obstructed in 5 cases, and in 3 the patient was not in labour.

(7–11) Other tumours. There was no maternal mortality and only one dead-birth in this small miscellaneous group. The tumour in the anterior wall of the bladder had obstructed labour for 3 days: it was not removed, the fœtus was dead. The case of obstructed labour, due to a "$4\frac{1}{2}$ months' tubal abortion," is an unusual one. In the case of the four "unclassified pelvic tumours" no information about the nature of the tumours is given.

(*b*) *Alterations in the axis of the canal due to operations.*

This group comprises 13 cases of ventral-fixation, 2 of ventral-suspension, one of Gilliam's operation, and 3 of Schauta-Wertheim's interposition. There was no maternal or fœtal mortality, but four children (1 case of twins) died later. In two of the ventral-

fixation cases, there was also cicatricial contraction of the cervix due to previous amputation, and in one of these there is a doubt as to whether the amputation of the cervix or the ventral-fixation was responsible for obstructed labour. In many cases the extreme alteration in the direction of the uterine axis is noted, *e.g.*, " cervix under left ribs," " cervix very high up posteriorly," " anteflexed position of uterus," " posterior development of the uterus." In some cases it is noted that the uterus was incised through its posterior wall. In one case the uterus was found ruptured, due to unsuccessful attempts at internal version for transverse lie of the fœtus. Nearly all were cases of obstructed labour; it is stated that three were not in labour, and labour was induced unsuccessfully in one. In three cases the Cæsarean section was followed by hysterectomy.

(*c*) *Narrowing due to vaginal and perineal operations.*

These four cases were: "firm contraction of repaired perineum," early in labour; " recently repaired perineum," not in labour; " colporrhaphy," not in labour; " extensive colporrhaphy," early in labour. There was no maternal mortality.

(*d*) *Contraction- or retraction-rings.* Three cases.

(i) Contraction-ring; in labour 3 days, no progress, cervix half dilated; result to mother and child good. (ii) Contraction-ring; premature rupture of membranes, manual dilatation and hydrostatic bag failed, forceps failed; mother lived, child died. (iii) Retraction-ring round shoulder; 36 hours in labour, forceps failed; mother and child both lived.

(*e*) *Congenital malformations of uterus and vagina.*

(1) Uterus: two cases of non-pregnant horn of a bicornute uterus obstructing labour; one case of obstructed labour due to double uterus, cervix and vagina; one case of obstructed labour due to a unicornute uterus. (2) Vagina: one case with vaginal septum obstructing labour; two cases with vaginal septum, not in labour; one case of obstructed labour due to vaginal septum and uterus bicollis.

There was no mortality, either of mother or child, in this group.

(*f*) *Rigidity or stenosis of cervix or vagina.*

The cases comprising this group are specified in Table XI. All mothers and children lived. From a labour point of view many were essentially cases of delayed first stage. Of the three cases of " rigid cervix," one was a primigravida of 45, long in labour; one a primigravida of 38, long in labour; and

one a case of long labour, with the uterus becoming hard and tender, in which a speculum and probe had to be used to find the pin-hole os, through which meconium was escaping. No causes are stated for the cases of "atresia of the cervix," or "cicatricial bands of the cervix or vagina." The cases of absence of the cervix and occlusion of the os uteri were consequent on operations for prolapse, including amputation of the cervix. The case of "atresia of the vagina" was accompanied by "imperforate hymen" which, on incision, was found to be a quarter of an inch thick.

GROUP I. *B.* (*a*) *Excessive size of fœtus.*

Among the 16 cases there was only one maternal death, and this is hardly a fair case; the operation was undertaken as a last resort after forceps, perforation, decapitation and cleidotomy had failed to deliver the fœtus. All the other mothers lived, despite the fact that many of the patients had been long in labour, and forceps had failed in two. One fœtus was born dead (after forceps had failed), and two died after birth (one of cerebral hæmorrhage, after forceps had failed). Four of the patients are noted as having had former dead-births resulting from difficult labour due to excessive size of the fœtus; in this point, this group overlaps Group III (*a*) ("former death of fœtus from difficult labour"). The three heaviest children noted weighed 12, 11 and 10½ lbs. respectively. In only one case is it noted that pregnancy had been unduly prolonged.

(*b*) *Malpresentations.*

(1) Occipito-posterior; in these two cases forceps had failed; both mothers lived and one child died in a few hours from cerebral hæmorrhage.

(2) Brow presentation; all three cases had been long in labour, including one failure with forceps. One mother died (forceps had failed); one child lived, one had spina bifida and hydrocephalus, and the fate of the third is not noted. There were two other brow presentations, but they were accompanied by rupture of the uterus, and have been included in Group IV.

(3) Breech presentation; there was no maternal mortality, and all the children lived in these three cases. In one there were "extended legs," and the mother chose Cæsarean section; in another there was "impacted breech," and a live child was particularly desired; in the third the legs were extended and could not be brought down. All the mothers were primigravidæ. Two other cases of breech-presentation are included under other groups; one under "presentation of the cord" and the other under "repeated death of fœtus during labour."

(4) Transverse presentation; two of the five mothers died from general peritonitis, two of the fœtuses were born dead, and one child died later. Four of the patients had been very long in labour and one was early. Of the two maternal fatalities, in one there was tonic contraction of the uterus and impending rupture and in the other labour had lasted four days.

(*c*) *Malformations.*

Four cases of hydrocephalus. (i) A primigravida in labour at term for 48 hours; head above brim. (ii) A primigravida in labour at term, head above brim, normal pelvis. (iii) A primigravida in labour, head above brim; fœtus also had spina bifida. (iv) The patient was sent into hospital with the fœtal head retained after decapitation; œdematous vagina very soft and septic and tore easily on any manipulation. Porro-Cæsarean section, with transfixion pins and elastic ligature; recovery with only slight pyrexia. There was no maternal mortality. Two further cases of hydrocephalus occurred in association with ruptured uterus, and are included in Group IV (q. v.).

Group II. *Grave maternal diseases;* 61 cases.

(1) Cardiac disease. There were 40 cases, with a maternal mortality of 9 cases, or 22.5 per cent.; one fœtus was born dead and 6 children died later. The details are too scanty to furnish material for an elaborate analysis. The varieties of cardiac disease were distributed as follows: (*a*) Mitral disease: 11 stenosis, 2 regurgitation, 3 double, and 6 "mitral disease." (*b*) Aortic disease: 3 regurgitation, and 1 double. (*c*) Aortic and mitral disease, 5 (*d*) "Cardiac disease," 9. The stage of the disease as regards compensation is seldom mentioned: in 6 cases the heart is stated to be failing or uncompensated. In 24 the patient was not in labour, in 9 she was in labour, and in the remainder there is no information. Spinal analgesia was used in a few cases. The details of the fatal cases are as follows: (i) Mitral stenosis, cardiac failure, in labour, child lived. (ii) Double mitral disease, not in labour. Spinal analgesia. Death the same day; the child died on the 5th day. (iii) Mitral stenosis, moribund on admission; the child died. (iv) Aortic incompetence, not in labour; death on the operating table; child lived. (v) Mitral stenosis, bronchopneumonia at both bases, cardiac failure, spinal analgesia. Death three days after operation from cardiac failure; child lived. (vi) Cardiac disease, 28 weeks' pregnant, uncompensated heart, œdema of legs and cyanosis; child died. (vii) Mitral stenosis and aortic incompetence, cardiac failure, not in labour, spinal analgesia; died in five days, child lived. (viii) Mitral stenosis, spinal analgesia; died

on sixth day from heart failure. (ix) Mitral stenosis, uncompensated and dying, not in labour; died on third day from heart failure; child living.

(2–17) Other grave maternal diseases. Among this miscellaneous group of 21 cases there were 9 maternal deaths as follows: (i) Bronchitis and dilated heart; 6½ months' pregnant, cyanosis and œdema; died from cardiac failure after temporary improvement. (ii) Asthma and bad general condition, in labour, child lived. (iii) Diabetic coma; moribund, died during operation, fœtus dead. (iv) Cerebral hæmorrhage, cerebral tumour, at term; died in a few hours, child lived. (v) Chorea, very violent, much œdema of lungs, 20 weeks' pregnant, maniacal; died a few hours after operation. (vi) Septicæmia, cause not stated; died of septicæmia on tenth day; child lived. (vii) Persistent vomiting, active phthisis; no cause of intestinal obstruction found at operation; died of hæmoptysis and persistent vomiting; fœtus dead. (viii) Intestinal obstruction due to a band, not in labour, eight months' pregnant; died in 24 hours from general peritonitis, fœtus dead. (ix) Intestinal obstruction, moribund; the peritoneum was salmon-pink in colour and studded with yellow clots the size of a pin's head; no actual obstruction found; " ? acute pancreatitis "; fœtus dead.

The fœtal and infant mortality of this group, besides that occurring in the above cases of maternal death, belonged to the following cases: both cases of pulmonary tuberculosis, the case of pleurisy, of uræmic fits, of chronic nephritis, one case of varicose veins.

GROUP III.

(1) *Former repeated death of fœtus during labour.* The details of this interesting group of ten cases are as follows: (i) iii-para, aged 39; first child died aged 3 months from pneumonia; second born dead, forceps; third born dead, prolapsed cord. Not in labour, "opération de complaisance." (ii) Aged 37, one former forceps dead-birth; not in labour, operation by special request of mother. (iii) iii-para, aged 42; first child alive, second breech dead-birth, third forceps dead-birth. The child died two days after the operation from hæmorrhagic disease of the new-born. (iv) ii-para, with albuminuria, both children born dead after forceps delivery. The mother died four days after operation; post-mortem examination showed subacute yellow atrophy of liver and chronic nephritis. (v) vi-para, all dead-births; one forceps dead-birth, two breech dead-births, three dead-births after normal labour; in labour at term. (vi) The same patient as the last, with her second Cæsarean section. (vii) ii-para; the first a dead-birth, the second lived three days: not in labour, hydramnios. The child unfortunately had hydrocephalus, and died in 11 days. (viii) x-para;

the first four children all alive and after normal labours; the next three dead-born after breech-labours. The next three were by her second husband; one living, breech labour; one lived a few hours, breech labour; one lived a few days, breech labour, weight 12 lbs. The child delivered by Cæsarean section weighed 12 lbs. (ix) ii-para; both were dead-births, weighing 10 and 14 lbs. respectively. There was hydramnios; the child weighed only 4 lbs. and died the day after operation. (x) A v-para, aged 41; had habitually large children; one normal labour, one forceps delivery and three craniotomies.

There was no mortality in this group other than in the one mother and two children noted above.

(2) *Fœtal distress.* All the five mothers and all the children lived. The details are: (i) Primigravida, aged 41; operation at request of mother. (ii) Primigravida, aged 38; operation at request of mother. (iii) Primigravida, aged 39;in labour after induction, membranes ruptured. (iv) i-para, aged 30; dead-birth after forceps, fœtus weighed 12 lbs. In labour, membranes ruptured 14 hours, "os 3/-," head high. (v) i-para, aged 36; in labour 36 hours, membranes intact, "os 5/-," uterine inertia, doubtful if head would come through.

(3) *Prolapse or presentation of umbilical cord.* No maternal mortality. The case of presentation was in a breech labour; the child died on the 12th day. The case of prolapse was probably in association with contracted pelvis, since the first three children were delivered by forceps, and the fourth by craniotomy; the patient was in labour with the head not advancing; the child lived.

(4) *Hydramnios.* Few details of these two cases are given. One was a primigravida of 42; the other was a iii-para, 32 weeks pregnant, and the fœtus was macerated. There was no maternal mortality and one child lived.

(5) *Missed labour.* Pregnancy normal up to full-time, when fœtal movements ceased and the abdomen gradually became smaller. Operation performed two months after full-time; fœtus macerated. The mother lived.

GROUP IV.

Ruptured uterus. The details of these nine cases are as follows: (i) Obstructed labour, cause not stated, prolapsed cord, internal version, ruptured uterus; Cæsarean section and hysterectomy; mother lived, fœtus dead. (ii) Long in labour, primigravida, uterus ruptured, cause not stated; Cæsarean section and hysterectomy; mother died of shock, fœtus dead-born. (iii) vii-para; all labours instrumental and children big; long in labour, forceps had failed; lower uterine segment found ruptured on admission;

Cæsarean section and hysterectomy; mother lived, child died. (iv) iii-para, long in labour, forceps had failed; on admission, contraction-ring felt, and tear of lower uterine segment; Cæsarean section and hysterectomy; mother and child both lived. (v) iv-para, normal labours; in labour, uterus found ruptured; Cæsarean section and hysterectomy; the dead fœtus was hydrocephalic and the mother died shortly after the operation. (vi) Ruptured uterus and hydrocephalus; Cæsarean section and hysterectomy; mother lived, fœtus dead. (vii) ii-para, one craniotomy and one Cæsarean section; contracted pelvis; Cæsarean section and hysterectomy; mother lived, fœtus dead. (viii) Ruptured uterus, late in labour with brow presentation; Cæsarean section and hysterectomy; mother lived, fœtus dead. (ix) Brow presentation, efforts at version failed, cervix was found split high up where bleeding was uncontrollable; Cæsarean section and hysterectomy; mother and child both lived.

A summary of these nine cases shows that two mothers died, five fœtuses were born dead and two children died later. The cause of the rupture was stated to be brow presentation in two, hydrocephalus in two, after difficult forceps in two, contracted pelvis in one, and no cause stated in two.

GROUP V.

Miscellaneous indications, 17 cases. These are detailed in Table XI. There was no maternal or fœtal death in this group; the only child which died in hospital was from one of the cases of "pain due to adhesions following removal of a suppurating appendix."

Tables of Cases

Table IX.—CONTRACTED PEL TAL

ABBREVIATIONS IN TABLES IX—XV.
C.G. = Catgut. C.S. = Cæsarean sect. D. = Died. D.B. = Dead-birth. F.T. = Full-time.
C.P. = Contracted pelvis. C.V. = Conjugata vera. D.C. = Diagonal conjugate. G. = Good, in sense of did no
L.U.S. = Lower uterine segm

No.	*Year.*	*Reg. No. and Name.*	*Age.*	*No. and Details of Previous Labours.*	*Indication.*	*Condition of Patient at of Operation, especiall regards Labour.*	*Tech*
3	1911	58 G.H.	21	P.	C.P.	Forceps before adm.	ers C.G.
26	1911	377 E.A.	31	M.5, 4 forceps, 1 craniot.	C.P., D.C. $3\frac{1}{2}$	2nd stage lab.	ers C.G.
68	1913	162 A.W.	24	P.	C.P., D.C. 4	Os = 4/-	ers silk
75	1913	305 M.B.	40	M.1, craniotomy	C.P.	No pains, os = 1/.	ers C.G.
83	1913	602 D.A.	30	M.2	Large child	Os full. Vagina bad on adm. T. 101° He engaged	ers silk
110	1914	148 K.G.	34	M.2, craniotomies	C.P., D.C. $3\frac{1}{4}$	In lab. Os $\frac{1}{2}$ dil. P cystitis. T. 102°, P. 12	ers C.G.
199	1915	966 R.B.	27	M.1, forceps, D.B.	C.P.	In lab. 5 hrs.	ers C.G.
277	1917	35 M.B.	38	M.1, Cæs. sect.	C.P., D.C. $4\frac{1}{4}$	Not in lab.	ers C.G.
278	1917	51 E.F.	33	M.1, forceps, D.B.	C.P.	Not in lab.	ers C.G.
291	1917	312 K.S.	38	M.2, craniotomies	C.P.	No notes	ers C.G.
322	1917	1176 I.C.	30	M.3, all forceps, D.B.	C.P.	Os = 1/-	ers C.G.
346	1918	376 A.B.	34	1 prem., 2 craniotomies, 1 breech.	C.P., D.C. $3\frac{3}{4}$	Not in lab.	ers C.G.
349	1918	463 M.W.	44	No note	C.P.	No note	ers C.G.
362	1918	725 E.B.	35	M.2, both D.B. 1 craniotomy	C.P.	?	ers C.G.
385	1918	1234 M.H.	30	M.2., 1 craniotomy, 1 Cæs. sect.	C.P.	Not in lab.	ers C.G.
387	1918	1272 A.P.	30	P.	C.P.	?	ers C.G.
418	1919	334 M.R.	45	M.2, 1 Cæs. sect.	C.P., D.C. $4\frac{1}{2}$	Not in lab.	ers C.G.
420	1919	369 A.P.	26	P.	C.P., D.C. $3\frac{3}{4}$	Prolonged labour at	ers C.G.
438	1919	808 M.B.	34	M.1, forceps, D.B.	C.P., D.C. $3\frac{1}{2}$	Poor condition Not in lab.	ers C.G.
467	1919	1452 S.W.	26	M.1, Cæs. sect.	C.P., D.C. $3\frac{3}{4}$	Not in lab.	ers C.G.
493	1920	185 C.P.	29	M.2, forceps, 1 D.B.	C.P., D.C. $4\frac{1}{4}$	Forceps at home. Os	ers C.G
505	1920	444 G.W.	29	P.	C.P., D.C. 4	Forceps at home.	ers C.G.
512	1920	581 D.C.	22	P.	C.P., D.C. $3\frac{1}{2}$	in lab. In lab., P. 140. F	ers C.G.
641	1911	412 D.	2	M.3	C.P., C.V. $2\frac{1}{4}$ +	before adm., brow Os = 3/-, 4 days i Membs. rupt. day	ransverse ttress sut cont. C.G
658	1911	1285 G.	27	P.	C.P.	Bandl's ring Failed forceps	ilk
659	1911	1326 R.	39	M.4, 1 Cæs. sect.	C.P., C.V. $2\frac{3}{4}$	Os = 2/-	ilk
660	1911	1325 H.	?	M.4	C.P.	Failure at indu Membs. rupt. 5 hrs.	ilk
671	1911	1291 A.H.	23	P.	C.P. C.V. $2\frac{1}{2}$	Os = 3/-. Membs. rupt.	ilk

D

TAL CASES.

M1, M2, &c. = Multipara–one child, two children, &c., previously. P = Primigravida. S.W.G. = Silkworm gut. con. = continuous. int. = interrupted. lab. = labour. mod. = moderate.

Technique.	*Result.*		*If Patient Died, state cause of Death and time after Operation.*	*Remarks on Puerperium.*
	Mother.	*Child.*		
ers C.G.	D.	G.	General peritonitis	——
ers C.G.	D.	G.	General peritonitis	——
ers silk	D.	G.	D. 4 weeks after op. lobular pneumonia	Continued pyrexia from time of op. till D.
ers C.G.	D.	G.	5 days after op. peritonitis. D. in 8 days	Pyrexia 5th and 8th day
ers silk	D.	D.B.	D. Peritonitis in 2 days	——
ers C.G.	D.	G.	Peritonitis. D. on 3rd day	——
ers C.G.	D.	G.	Intestinal obstruction. D. 9 days after op.	Pyrexia from 1st day
ers C.G.	D.	G.	Embolism	Albuminuria
ers C.G.	D.	G.	Peritonitis	——
ers C.G.	D.	D.B.	D., 3 days lobar pneumonia	——
ers C.G.	D.	G.	D. 3rd day. Pulmonary embolus	——
ers C.G.	D.	G.	D. 4th day. Septic peritonitis	——
ers C.G.	D.	G.	Intestinal obstruction. D. 6 days after op.	——
ers C.G.	D.	G.	Peritonitis. D. 4th day	Laparotomy and drainage on 4th day
ers C.G.	D.	G.	Pneumonia. D. 4th day	——
ers C.G.	D.	D.B.	Septic peritonitis. D. 3rd day	——
ers C.G.	D.	G.	D. General peritonitis	Op. complicated by incisional hernia
ers C.G.	D.	G.	Hæmorrhage and shock. D. next day	——
ers C.G.	D.	G.	Pneumonia. D. 4th day. P.M. Warty vegetations on mitral valve. No peritonitis	——
ers C.G.	D.	G.	D. 7th day. Chronic bronch. and cardiac muscle failure	No pyrexia
ers C.G.	D.	G.	D. 18th day of gen. peritonitis	Severe pyrexia
ers C.G.	D.	G.	D. 4th day. Gen. peritonitis	——
ers C.G.	D.	G.	D. 4th day. Exhaustion	No pyrexia
nsverse fundal incision. ttress sutures (silk). Two cont. C.G.	D.	G.	D. Pneumonia 7th day	——
silk	D.	G.	D. 4th day. Septic absorption	T. rising steadily. No signs of peritonitis
silk	D.	G.	D. 6th day. Peritonitis. P.M. Septic peritonitis, pus in uterus at plac. site	——
silk	D.	G.	D. 3 days. ? Sepsis	No P.M. Evidence of old peritonitis at op., *e.g.*, dense adhesions
silk	D.	G.	Hæmorrhage, day of op.	Severe bleeding. Uterus could not be got to contract. Massage and ergotin used. Hæmorrhage stopped for a time but recommenced in bed

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at of Operation, especially regards Labour.	Techn
680	1912	185 N.	37	P.	C.P., C.V. 3	8 hrs. in lab. P fatigued	a-periton
683	1912	278 T.	26	P.	C.P., C.V. $2\frac{1}{2}$	Os=$\frac{1}{2}$. Memb. intact.	ble C.G.
685	1912	317 B.	28	M.2, 1 forceps, D.B.	C.P., C.V. $2\frac{3}{4}$	Os=5/-. Memb. intact.	ble C.G.
695	1912	732 M.W.	30	P.	C.P., C.V. $2\frac{3}{4}$	Os=1/-. Membs. rup 24 hrs.	hysterec
708	1912	1176 B.	36	P.	C.P., C.V. $3\frac{3}{4}$	In lab. for 21 hrs.	yers C.G.
749	1913	891 B.	39	M.5, 3 D.B.	C.P., C.V. 3	5 hrs. in lab. Memb for 2 hrs. Os=2/-	C.G.
751	1913	1229 L.R.	33	M.2, both D.B. 1 craniotomy	C.P., C.V. $2\frac{1}{4}$	Early in lab.	ransv. fun C.G.
771	1914	251 M.	35	M.4	C.P., C.V. $3\frac{1}{4}$	4 days in lab. Memb 3 days before op.	a-periton
789	1914	1048 H.	39	M.5, 1 Cæs. sect.	C.P., C.V. $2\frac{3}{4}$	Os. nearly full. M intact	ransverse esion
797	1914	1558 M.	37	M.4, 3 D.B.	C.P.	?	?
838	1916	270 B.	24	M.2, 1 transverse, D.B.	C.P., C.V. $2\frac{3}{4}$	Early in lab.	yers C.G.
869	1916	1212 R.	22	P.	C.P., C.V. 3	In lab.	yers C.G.
879	1916	1635 R.L.	26	P.	C.P., C.V. 1	Cervix not reached b of pelvic contraction	yers C.G.
916	1918	588 G.	33	M.8	?	?	hysterec
932	1918	1241 B.	35	P.	C.P., C.V. $3\frac{1}{4}$	Forceps failed	yers C.G.
936	1918	1373 M.McI.	26	P.	C.P., C.V. $3\frac{1}{4}$	24 hrs. in lab. Memb by midwife. Many exams.	yers C.G.
949	1918	1304 McC.	24	M.1, forceps, D.B.	C.P., C.V. $3\frac{1}{4}$	Brought in from dist	S., int.
1039	1912	466 E.A.H.	26	M.3	C.P., D.C. $3\frac{3}{4}$	In lab. 2 P.V. exams.	C.G. and
1044	1913	41 E.F.	38	M.1, forceps	C.P.	In lab. 16 hrs.	C.G. and
1054	1913	E.G.	33	M.6	C.P., D.C. $3\frac{3}{4}$	In lab. 2 P.V. exams.	thread a
1059	1913	E.K.	20	P.	C.P.	In lab. 2 days. rupt. 6 hrs. T. 100°, on adm.	yers C.G.
1066	1914	90 L.F.	31	P.	C.P.	Long in lab. Tran presentation. Arm c Tonic contraction. Col	pravag. ing uter
1129	1916	67 M.E.F.	36	M.5, 2 forceps, D.B.	C.P.	In lab. 24 hrs. F applied twice before Large head not en Tonic contraction	pravag. ing uter
1133	1916	116 D.F.	20	P.	C.P., D.C. $3\frac{3}{4}$	In lab. F.T. Memb. 2 P.V.	thread a
1154	1916	384 S.H.	40	P.	C.P.	In lab. 40 hrs. Memb at onset of lab.	yers C.G.

Technique.	Result. Mother.	Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
ra-peritoneal	D.	G.	D. under anæsth. Cardiac failure	—
ble C.G.	D.	G.	P.M. Septic peritonitis. D. 5th day	—
ble C.G.	D.	G.	D. 5th day. Peritonitis	T. up to 105°. Râles and frictions, but no signs of pneumonia
hysterectomy	D.	G.	D. 9th day	Continuous pyrexia
vers C.G.	D.	G.	D. 6th day. Septic peritonitis	Double uterus
C.G.	D.	G.	D. 3rd day. Pneumonia? Sepsis?	Rapid respirations. Râles in chest.
Transv. fundal, 3 mattress silk, C.G.	D.	G.	D. 5th day. P.M. Paralytic distension of stomach and small intestine. Uterine wound healing well. No uterine sepsis. No peritonitis	
ra-peritoneal	D.	G.	D. 16 hrs. after op.	Much vomiting after op.
Transverse fundal because of sion	D.	G.	D. 7th day. ? Broncho-pneumonia	Chest symptoms after op.
?	D.	G.	D. 7th day. Septicæmia. No P.M.	—
vers C.G.	D.	G.	D. 2nd day. P.M. septic peritonitis	—
vers C.G.	D.	G.		D. 18th day. Sepsis and broncho-pneumonia
vers C.G.	D.	G.	D. peritonitis, 14th day	—
hysterectomy	D.	G.	No cause stated. D. on 2nd day	—
vers C.G.	D.	D.B.	D. 5th day	Child D. 2nd day. Subdural cerebral hæmorrhage
vers C.G.	D.	G.	D. 10th day. Peritonitis	—
S., int. silk, int. C.G.	D.	G.	D. 5th day	—
C.G. and cont. C.G.	D.	G.	D. 5th day. Acute broncho-pneumonia	Owing to distension of abd. reopened on 5th day, but only a little free fluid and distended gut found. Death the same day
C.G. and cont. C.G.	D.	G.	D. 4th day. Acute broncho-pneumonia	T. 101.2°, P. 120, R. 40 within 12 hrs. of delivery
thread and cont. C.G.	D.	G.	D. from acute peritonitis on 5th day	—
vers C.G.	D.	G.	D. in 12 hrs. Shock and septic absorption	
pravag. hysterect. without ing uterus	D.	D.B.	D. on 9th day. Acute broncho-pneumonia and septicæmia	—
pravag. hysterect. without ing uterus	D.	D.B.	D. 5th day. Peritonitis	P. 160 on adm.
thread and cont. C.G.	D.	G.	D. 4th day. Mania and acute gonococcal septicæmia	T. 100° 24 hrs. later, P. 120—130. Lochia offensive. Unconscious; screaming on 3rd day, then coma
vers C.G.	D.	G.	D. on 4th day. General peritonitis	—

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at of Operation, especially regards Labour.	Techn
1155	1916	399 M.H.	23	P.	C.P., D.C. $3\frac{3}{4}$	In lab. 30 hrs. Memb. 16 hrs. 2 P.V.	thread an
1159	1917	45 B.D.	23	P.	C.P.	In lab. 24 hrs. Memb. 18 hrs. Forceps ap twice before adm.	C.G. and
1224	1919	23 J.F.	30	P	C.P.	In lab. 48 hrs. before Forceps applied 20 previously. Pt. vom "coffee grounds." C not fully dilated	thread an
1229	1919	99 A.M.	20	P.	C.P	In lab. Memb. not Acute bronchitis before	thread an
1258	1919	633 A.K.	24	P.	C.P.	In lab. 7 hrs. Memb rupt. 1 P.V.	C.G. and
1312	1911	264 E.L.	32	M.1, forceps, D.B.	C.P.	In lab. 27 hrs.	C.G. and
1316	1911	384 M.J.C.	27	M.2, 1 craniotomy and 1 Cæs. sect.	C.P.	Not in lab.	
1383	1915	128 M.G.	38	M.11, 2 Cæs. sects.	C.P.	Not in lab.	
1409	1916	385 E.G.	18	P.	C.P.	In lab. and memb. Cord prolapsed. Appen	S. Appen ial incisio
1443	1917	626 M.A.	26	M.1, Craniotomy	C.P.	Not in lab.	
1499	1919	407 M.H.	26	P.	C.P.	31 hrs. in lab. Ad hospital after forceps applied.	
1529	1920	232 J.E.	27	P.	C.P.	Induction of lab. 3 before op. Breech pr Prolapsed cord. Memb.	
1556	1920	666 E.G.	33	M.3, 2 forceps D.B.	C.P.	Induction of lab. 4 before op. In lab. 2 Head above brim	
1589	1913	197	27	P.	C.P.	In lab. 48 hrs. Fœtal found fractured	med.
1604	1914	427	31	P.	C.P.		med.
1647	1915	1052	44	M.5	C.P.	In lab.	med.
1687	1917	197	27	P.	C.P.	In lab. 2 days. Thick of alb.	med.
1763	1920	19	23	P.	C.P.	In lab. Forceps. C tomy. Uterus rupt.	med. and
1773	1920	257	37	M.7, all craniotomy	C.P.	In lab. on adm. T. P. 130. Membs. rupt.	med.
1808	1911	313	29	M.3, 2 forceps, D.B.	C.P.	Not in lab.	med.

Technique.	*Result.*		*If Patient Died, state cause of Death and time after Operation.*	*Remarks on Puerperium.*
	Mother.	*Child.*		
thread and cont. C.G.	D.	G.	D. on 19th day. Localized abscess in utero-vesical pouch communicating with uterus; obstruction of small gut	At first acute bronchitis; then gradually increasing obstruction
C.G. and cont. C.G.	D.	D.B.	D. from septic peritonitis on 9th day	All symptoms of general peritonitis. Abd. wound septic. Fœtus much injured by forceps
thread and cont. C.G.	D.	D.B.	Pt. collapsed, and did not rally following op., and D. a few hrs. later	Fœtus severely injured by forceps
thread and cont. C.G.	D.	G.	D. on 11th day. Acute pneumonia (probably influenza)	T. 150° after op.; rose to 101° on 5th day, and 103° on 10th day
C.G. and cont. C.G.	D.	G.	D. on 5th day from peritonitis and broncho-pneumonia	P. 120—140 from 2nd day till death. T. 101°—103°.
C.G. and cont. C.G.	D.	G.	D. on 5th day. General peritonitis	T. 102.6° on 3rd day. On 5th day wound was opened; peritoneal fluid excessive; bowels injected; pelvis was drained. Pt. suddenly collapsed and D. P.M. General peritonitis; uterine wound sound
—	D.	G.	D. 5 days after op. General peritonitis	Abd. wound reopened for drainage
—	D.	G.	D. from double pneumonia. Cardiac failure	—
S. Appendicectomy. Paramedial incision	D.	G.	D. 7 days after op.	Pt. vomited 6 days after op. Abd. opened along old incision. Intestines inflamed and distended. Peritonitis. Appendix inflamed and bound down by adhesions. Appendicectomy. D. next day
—	D.	G.	D. suddenly day after C.S. Pulmonary embolism	—
—	D.	D.B.	D. 6 days later. Puerperal septicæmia	P.M. Peritonitis and septic endometritis
—	D.	G.	D. 10 days later. Pneumonia and sepsis	—
—	D.	G.	D. 4 days later. Sapræmia	—
med.	D.	D.B.	—	—
med.	D.	G.	Pulmonary embolism. D. 4th day	
med.	D.	G.	General peritonitis. D. 2 days later	—
med.	D.	G.	—	2 days later very distended. Laparotomy; purulent peritonitis. D. 3rd day
med. and hysterectomy	D.	D.B.	D. Collapse 3 hrs. after op.	—
med.	D.	G.	D. 5th day. Pneumonia	—
med.	D.	G.	D. 13th day. Intestinal obstruction	Second op. on 12th day for intestinal obstruction

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at Operation, especially as regards Labour.	Technique
1818	1911	L.G.I., C.C.	27	P.	C.P.	2½ days in lab. Forceps. sect. disch.	hysterect
1820	1912	L.G.I., F.L.	35	P.	C.P., D.C. 3¾	Some hrs. in lab. Os	agina swa before op
1826	1915	L.G.S., B.C.	36	M.4, 1 craniotomy, 2 forceps, alive	C.P.	Lab. just began	—
1843	1912	W. & C.H., E.P.	45	?	C.P.	?	silk
1856	1915	W. & C.H., M.D.	24	1 prev. Cæs. sect.	C.P., D.C. 3¼	?	silk
1938	1911	S.E.	34	M.2	C.P.	?	C.G.
1943	1914	E.D.	28	P.	C.P., D.C. 3¼	In lab. 60 hrs. Freq. by midwife. T. raised op.	C.G.
2013	1920	S.T.	25	M.1, Cæs. sect.	C.P.	In lab. 24 hrs. Memb. r	C.G.
2017	1915	L.L.	21	M.1	C.P., D.C. 2¾	?	C.G.
2053	1913	R.A.	38	P.	C.P.	Emergency op. F. sounds feeble	—
2119	1917	E.M.	32	P.	C.P.	Forceps applied outside Hosp. before	sical
2129	1918	A.N.	43	M.3, 2 D.B.	C.P.	In lab. Memb. rupt.	sical
2176	1920	A.W.	41	P.	C.P., D.C. 4¼	Forceps applied before	sical
2179	1920	L.A.E.	31	P.	C.P.	In lab. Sent in for sect. Forceps appli Hosp.	sical
2320	1911	1252 H.B.	27	M.1, D.B.	C.P., D.C. 4	In lab. 3 days. O yers C.G. os=5/-. Attempt at d in Hosp. with forceps	
2325	1911	427 M.S.	22	—	C.P.	Collapsed. 3 days External genitals œde and gangrenous. sloughy	and con
2384	1918	1207 J.L.	?	—	C.P.	Very ill. Thinnin sloughing of lower segment	and con
2423	1920	1112 H.B.	40	—	C.P., Plac. Præv	In lab.	and con
2433	1920	H.	30	—	C.P., C.V. 3½	In lab. 5 days. Morib adm.	and con
2455	1913	189 N.S.	26	P.	C.P.	In lab. 48 hrs. before Os full. Membs. rupt. had been inserted and applied	sical
2478	1916	158 M.C.	33	M.1, D.B.	C.P.	Not in lab.	sical
2492	1917	H.C.	18	P.	C.P.	In lab. 24 hrs. Memb. intact. 6 P.V.	yers C.G
2512	1920	270 F.H.	33	P.	C.P.	In lab. 36 hrs. Memb. rupt. 10 P.V. before adm.	sec erect
2532	1913	M.O'K.	26	P.	C.P.	In lab. 8 hrs. Memb.	silk
2536	1913	M.H.	35	P.	C.P.	Before lab.	C.G.

Technique	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
...s. sect. followed by supra-hysterect.	D.	?	D. peritonitis, 2 days after op.	—
...agina swabbed with tinct. before op.	D.	?	Peritonitis. D. 5 days.	—
—	D.	G.	Peritonitis. D. 8 days	—
... silk	D.	G.	Broncho-pneumonia. D. 4 days later	—
... silk	D.	G.	Peritonitis. D. 36 hrs. after op.	—
... C.G.	D.	D.B.	Intestinal obstruction. D. 5 days	—
... C.G.	D.	?	Septicæmia. D. 6 days	—
... C.G.	D.	G.	Sepsis. D. 24 days	Thinness and rupture of former scar noted
... C.G.	D.	G.	Septicæmia. D. 7 days	—
—	D.	D.B.	General peritonitis	—
...sical	D.	G.	General peritonitis. D. 5 days after op.	—
...sical	D.	G.	D. 5th day. Septic peritonitis	Pt. developed acute obstruction (probably paralytic ileus). Abd. opened and intestines punctured
...sical	D.	D.	D. 5th day. Septic peritonitis	Child died later; patent foramen ovale
...sical	D.	D.	D. 4th day. Septic peritonitis	Child D., 1 month old
...yers C.G.	D.	G.	D. 6th day. Septic peritonitis	—
... and cont. C.G.	D.	D.B.	D. 2nd day from sepsis and collapse	—
... and cont. C.G.	D.	?	D. 12th day. Sepsis	—
... and cont. C.G.	D.	?	D. shortly after op. from hæmorrhage	Uterus would not contract, and pt. collapsed shortly after op.
... and cont. C.G.	D.	D.B.	D. next day	—
...sical	D.	D.B.	D. on 6th day from septicæmia	—
...sical	D.	G.	D. on 5th day. Sepsis	P.M. Septic peritonitis. No organisms grown from intra-uterine swabs; presumably exogenous infection at op.
...yers C.G.	D.	G.	D. 14 days after op. Pneumonia.	Influenza developed at end of 1st week
...s. sect. and subtotal ...erect	D.	G.	D. 14th day from septicæmia. P.M. purulent pneumonia, multiple emboli, pelvic abscess	Pt. nearly died during op. from hæmorrhage. Saved by hysterectomy and blood transfusions
... silk	D.	G.	Septic peritonitis. D. 9th day	—
... C.G.	D.	G.	General peritonitis. D. 8th day	—

No.	Year	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication	Condition of Patient at Commencement of Operation, especially as regards Labour.	Technique
2556	1916	K.K.	38	M.4	C.P.	In lab.	mortem C
2561	1916	I.C.	23	M.1, craniotomy	C.P.	In lab.	silk
2607	1914	325 S.	38	M.2, 1 D.B.	C.P., D.C. $3\frac{1}{4}$	Tonic uterine contract	peritonea
2633	1918	525 C.	20	P.	C.P., C.V. $2\frac{3}{4}$	In lab. 48 hrs. Memb.	peritonea
2642	1919	313 M.	25	M.4	C.P.	16 hrs. in labour. F applied	ers C.G.
2731	1920	3014 E.L.	37	P	C.P.	In lab. 48 hours. O thirds dilated. De Rib introduced, failed an during op.	S.W.G.
2764	1914	E.C.	36	M.2. both D.B	C.P.	?	silk
2765	1914	F.B.	42	M.1, D.B.	C.P.	?	?
2770	1914	A.H.	22	P.	C.P., D.C. $3\frac{3}{4}$	In lab.	ers C.G.
2774	1915	M.F.	28		C.P., C.V. $3\frac{1}{2}$	Not in lab. P.V. 6 days before	ers C.G.
2840	1917	E.A.	28	M.1, craniotomy	C.P.	Memb. rupt. 24 hrs.	silk
2859	1919	N.G.	38	M.6, 4 D.B., forceps and 2 Cæs. sects.	C.P., D.C. 4	pains 3 hrs. 3 P.V. ?	s. Sect. erect.
2865	1920	A.B.	36	M.3. all D.B., 1 craniotomy	C.P.	In lab. $4\frac{1}{2}$ hrs. Memb.	S.W.G. a
2868	1920	M.H.	33	M.5. 1 Cæs. sect.	C.P.	Not in lab.	G.
2881	1916	R.M.	22	P.	C.P., D.C. $3\frac{3}{4}$	In lab. (induced) T. 101°. P. 130. P exhausted	ers silk
2921	1919	L.O.	20	P.	C.P.	In lab. 7 days. rupt. Forceps applied	silk
2935	1912	S.B.	44	M.2. 1 D.B.	C.P.	Not in lab.	ers silk
3036	1919	H.	?	?	C.P.	In lab. 36 hrs. O Admitted from a midw district	ers silk
3048	1916	H.L.	37	?	C.P.	Pre-arranged	ical
3064	1919	L.B.	39	?	C.P.	?	ical
3068	1919	H.E.F.	40	M.1. D.B.	C.P., D.C. $2\frac{1}{2}$	Not in lab.	ical
3082	1912	P.	40	?	C.P.	Memb. rupt.	and C.G
3085	1914	V.	?	?	C.P.	In lab. Midwife's ca	and C.G
3086	1916	R.	36	M.1	C.P.	In lab. Memb. rupt.	and C.G
3098	1919	S.	?	?	?	In lab. Memb. intact	and C.G
3123	1914	C.T.	32	M.1	C.P.	In lab. 3 days. rupt. 2 days before Forceps failed. Hea engaged. Ill. Pulse 100—110	ers C.G.
3127	1919	E.S.	32	M.1, D.B.	C.P., A.P. hæm.	Nearly full time. last 14 days, twice se	ers C.G.
3128	1919	N.W.	34	M.1, forceps	C.P.	In lab. 20 hrs. F failed twice. Fœtal impacted. P. 102. R	ers C.G.

Technique.	Result. Mother.	Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
mortem Cæs. sect.	D.	G.	Pt. collapsed on skin incision and D. P.M. Fatty heart	—
silk	D.	G.	D. on 5th day. Lobar pneumonia	—
-peritoneal C.S.	D.	D.B.	D. on 5th day. Sepsis	—
-peritoneal C.S. with drain	D.	G.	D. from sepsis on 5th day	—
ers C.G.	D.	G.	D. on 4th day from sepsis	
S.W.G.	D.	G.	D. 48 hrs. after op. ? General peritonitis	Jaundice, distension and vomiting. P. rose from 112 1st day to 136—144 at death. T. never above 98°
silk	D.	G.	D. 2nd day	—
?	D.	?	D. 36 hrs. after op.	—
ers C.G.	D.	G.	D. on 24th day. Sepsis	Septic peritonitis diagnosed on 3rd day. Lower part of wound opened, tubes inserted
ers C.G.	D.	G.	D. on 8th day. Septic peritonitis	Myomectomy performed. Small fibroid in fundus
silk	D.	G.	D. on 9th day. Sepsis	—
s. Sect. and subtotal erect.	D.	G.	D. 10th day. Pulmonary embolus. Abd. wound infected, but healed	Old stitch-abscess found at op. in uterine wall, and many adhesions
S.W.G. and C.G.	D.	G.	D. 30th day. Pulmonary embolus on 25th day	—
G.	D.	G.	D. 10th day. Pulmonary embolus	—
ers silk	D.	D.	D. 7th day. Septicæmia	—
silk	D.	G.	D. 3rd day. Pneumonia	—
ers silk	D.	G.	D. 5th day. General peritonitis	—
ers silk	D.	G.	D. in 3rd week. Septicæmia	—
sical	D.	?	D. on 5th day. General peritonitis	—
sical	D.	G.	D. on 6th day	—
sical	D.	G.	D. on 3rd day. Acute paralytic ileus of stomach and intestines	—
and C.G.	D.	?	—	—
and C.G.	D.	G.	D. Septic infection	—
and C.G.	D.	G.	D. 2nd day. Hæmorrhage	—
and C.G.	D.	?	—	—
ers C.G.	D.	D.B.	D. 3rd day	Tympanites 2nd day. No vomiting. No rigidity or other gross evidence of peritonitis. T. once over 100°F.
ers C.G.	D.	G.	D. 11th day. Pneumonia	Distension and tympanites. T. not over 100° till 9th day, then rose to 103 and 104°
ers C.G.	D.	D.B.	D. 5th day. Sepsis	Very collapsed after op. P. fast and intermittent. Rigor 3rd day. Sudden death in 10 mins. T. not over 100.2°

No.	*Year.*	*Reg. No. and Name.*	*Age.*	*No. and Details of Previous Labours.*	*Indication.*	*Condition of Patient of Operation, especially as regards Labour*	*Technique*
3142	1915	M.H.	30	P.	C.P.	2nd stage lab. Ad... forceps applied	...cal
3150	1917	A.D.	28	?	C.P.	In lab. 1st stage. ... Memb. intact	...cal
3158	1915	M.R.	29	M.3, 2 forceps	C.P., D.C. 4.	Lab. induced. Forceps	...cal
3204	1914	L.E.	44	P.	C.P., D.C. 4	Memb. rupt. 3 ... Numerous vaginal ... attempted forceps ... before adm.	... sect. ...omy
3220	1920	E.Y.	22	P.	C.P., D.C. 3¾	In lab. 36 hrs. ... before adm. On adm. ... P. 132	...ers C.G.
3226	1912	L.H.	17	P.	C.P., C.V. 2½	Craniotomy outside ... before adm. Head ... be delivered	...ers silk
3268	1912	C.G.	27	M.2	C.P.	In lab 25 hrs. Forceps	
3276	1917	M.R.	18	P.	C.P., D.C. 2¾	In lab. 6 hrs.	
3283	1919	M.McD.	31	M.4, all D.B. 1 craniotomy	C.P., D.C. 3¼	?	
3289	1915	J.E.	45	M.8, 1 to 7 induced, all D.B., last a Cæs. sect.	C.P., C.V. 3	Not in lab. No P.V.	...ers silk
3305	1920	F.P.	29	P.	C.P., C.V. 3	In lab. 4 days. Ma... exams.	...ers silk
3314	1914	W.	29	P.	C.P., D.C. 3½	Memb. rupt. 14 hrs. ... op. Forceps failed	...ers sil...
3356	1914	J.L.	27	M.1, craniotomy	C.P.	In lab. many hrs.	...ers C.G.
3384	1913	E.J.	38	?	C.P.	In lab. many hrs. ... exams. Craniotomy ...	

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
ical	D.	?	D. 5th day	No details
ical	D.	G.	Cause not stated	Vomiting persisted from op. till death. Highest T. 100.4°F.
ical	D.	G.	D. 20th day. Septic peritonitis	Abd. reopened on 16th day for peritonitis and ileus, drained
sect. followed by hysomy	D.	G.	D. in 48 hrs. Sepsis	—
ers C.G.	D.	G.	D. 3rd day. Sepsis	—
ers silk	D.	D.B.	D. next day. Exhaustion	—
?	D.	G.	D. 10 days after op. Pneumonia	2 days after op. T. rose and pt. developed signs of pneumonia
?	D.	G.	D. 5 weeks after op. General peritonitis	Abd. reopened 4 weeks later. General peritonitis, R. tube involved
?	D.	?	D. of cardiac failure 36 hrs. later. Uterus well contracted and abd. wound satisfactory	—
ers silk	D.	G.	D. 8th day, peritonitis and pneumonia	D. after laparotomy for drainage
ers silk	D.	G.	D. 11th day after op. General peritonitis	—
ers silk	D.	D.	D. 3 days after op. Septic peritonitis	Child lived 10 mins.
ers C.G.	D.	G.	D. 13 days after op. Pulmonary thrombosis, septic uterine cavity	—
?	D.	D.B.	D. 48 hrs. Shock and septicæmia	

Table X.—CÆSAREAN SECTION AFTER FORC

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient a of Operation, especia regards Labour.	Techn
3	1911	58 S.H.	21	P.	C.P.	Forceps before adm.	ers C.G.
8	1911	128 N.D.	30	P.	C.P., D.C. 3	Forceps before adm.	ers C.G.
24	1911	74 S.H.	29	M.2, forcep.	C.P., D.C. $3\frac{1}{2}$	Prolapsed cord. before adm.	ers silk
39	1912	356 M.P.	24	P.	C.P., D.C. 3	Os full. Forceps befo	ers C.G.
45	1912	356 M.P.	24	M.1, D.B.	C.P., D.C. $3\frac{1}{2}$	Os full. Forceps befo	ers silk
57	1912	884 M.S.	34	P.	C.P., D.C. 3	Os full. Forceps befo	ers C.G.
177	1915	451 M.B.	35	M.1, craniotomy	C.P., D.C. $3\frac{3}{4}$	Os full. Forceps befo	ers C.G.
213	1916	36 E.J.	33	P.	C.P., D.C. 4	44 hrs. in lab. before adm.	ers C.G.
493	1920	185 C.P.	29	M.7, 3 induced, 1 Cæs. sect.	C.P., D.C. $4\frac{1}{4}$	Os = $\frac{1}{2}$. Forceps befor	ers C.G.
505	1920	440 G.W.	29	P.	C.P., D.C. 4	In labour 36 hrs. before adm.	ers C.G.
512	1920	581 D.G.	22	P.	C.P., D.C. $3\frac{1}{2}$	Brow present, before adm. P. 140	ers C.G.
527	1920	836 J.J.	30	P.	C.P., D.C. $3\frac{3}{4}$	Forceps before adm.	ers C.G.
550	1920	1239 E.W.	26	P.	C.P.	In lab. 3 days. before adm.	ers C.G.
634	1911	182 S.	30	M.1, D.B.	C.P., C.V. $2\frac{3}{4}$	In lab. 10 hrs. failed	
658	1911	1285 G.	27	P.	C.P.	Forceps failed outsid	silk
820	1915	790 N.	31	P.	C.P., C.V. $3\frac{1}{8}$	Os = $\frac{1}{2}$. Memb. rupt. applied before os w dilated.	silk
831	1915	1191 H.	30	M.1, craniotomy	C.P., C.V. $2\frac{1}{4}$	Os = $\frac{3}{4}$. Forceps fail	ers C.G
876	1916	1297 M.	20	P.	C.P., C.V. $2\frac{1}{4}$	In lab. 2 days. P exam. by midwife failed by Dr.	silk
932	1918	1241 B.	35	P.	C.P., C.V. $3\frac{1}{4}$	Forceps failed	ers C.G
1016	1911	49 R.S.	35	P.	C.P.	In lab. 24 hrs. Mem Forceps before adm. after adm.	ers C.G
1046	1913	68 N.G.	29	P.	C.P.	In lab. 2 days. before adm.	thread
1065	1914	83 E.H.	35	M.2	C.P.	In lab. Forceps bef 2 P.V.	thread
1073	1914	208 F.L.	36	P.	C.P., D.C. 4	In lab. 4 days. before and severa adm. Forceps applied success, followed imm by op.	ers C.G
1083	1914	347 F.B.	40	M.7	C.P.	In lab. Forceps before adm. 2 P.V adm.	ers C.G
1085	1914	364 F.D.	25	P.	C.P.	In lab. Forceps before adm.	ers C.G

CRANIOTOMY HAD FAILED TO DELIVER.

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
rs C.G.	D.	G.	General peritonitis	—
rs C.G.	G.	D.	—	Afebrile
rs silk	G.	D.B.	—	Sl. pyrexia, 14 days
rs C.G.	G.	G.	—	Afebrile
rs silk	G.	G.	—	Febrile
rs C.G.	G.	D.B.	—	Pyrexia, 1st week
rs C.G.	G.	D.B.	—	Sl. pyrexia, 10 days
rs C.G.	G.	G.	—	Pyrexia, 10 days
rs C.G.	D.	G.	D. 18th day, general peritonitis	—
rs C.G.	D.	G.	D. 4th day, general peritonitis	.....
rs C.G.	D.	G.	D. 4th day, exhaustion	.....
rs C.G.	G.	G.	—	Pyrexia, 7 days
rs C.G.	G.	D.	—	Afebrile. Child D. congenl. syph.
	G.	G.	—	Placenta expelled P.V. Swab from cervix prior to delivery gave pure culture of staph. albus
ilk	D.	G.	D. 4th day, septic absorption	Pyrexia 4 days, rising steadily. No signs of peritonitis
ilk	G.	G.	—	Pyrexia 12 days. Purulent vaginal disch., pus from abd. wound
rs C.G	G.	D.B.	—	Sl. pyrexia 5 days
ilk	G.	G.	—	Afebrile
rs C.G.	D.	D.	D. 5th day	Child D. 2nd day, cerebral hæm.
rs C.G.	G.	G	—	Pyrexia 5 days. Slight bronchitis
hread and cont. C.G.	G.	D.B.	—	Febrile puerperium. Abd. wound opened on 9th day and was re-sutured
hread and cont. C.G.	G.	G.	—	Pyrexia for 10 days
rs C.G.	G.	G.	—	Irreg. pyrexia 1st week
rs C.G.	G.	G.	—	T. for 7 days. Slight bronchitis from 4th day
rs C.G.	G.	G.	—	Child's head badly marked by forceps, had convulsions on two occasions, but improved and went out well. Mother: Sloughing of many abrasions in vagina with offensive lochia on 7th day. T. 103° for 3 days at this time

No.	Year.	Reg. No.	and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient & of Operation, especia... regards Labour.	Tech
1102	1915	169	L.N.	39	M.7, 3 forceps, D.B.	C.P	In lab. 20 hrs. F... before adm. 3 P.V. adm.	rus swa Int. C
1104	1915	180	M.T.	26	P.	C.P.	In lab. 16 hrs. F... before adm.	rus swa Abd. ng uter
1129	1916	67	M.F.	36	M.5	C.P.	In lab. 24 hrs. F... twice before adm. H... engaged. Almost tot... traction. P. 160	C.G. C.G. and
1135	1916	126	A.S.	35	P.	C.P., D.C. 3½	In lab. Memb. r... hrs. Forceps before a...	C.G. and
1159	1917	45	B.D.	23	P.	C.P.	In lab. 24 hrs. F... rupt. 18 hrs. Forceps before adm.	C.G. and
1187	1918	47	G.M.	22	P.	C.P.	In lab. 24 hrs. F... rupt. 21 hrs. Forceps adm. Meconium comi...	C.G. and
1189	1918	64	D.K.	31	P.	C.P.	In lab. 36 hrs. F... rupt. 27 hrs. Forceps adm. Cervix now ½ ...	C.G. an
1224	1919	23	J.F.	30	P.	C.P.	In lab. 48 hrs. F... before adm. Vomiting grounds." Cervix no... dilated	C.G. an
1301	1911	6	M.H.	20	P.	C.P.	In lab. 31 hrs. Forceps	C.G. an
1304	1911	78	J.D.	23	P.	C.P.	In lab. 2 days. F... before adm.	C.G. an
1307	1911	106	I.R.	27	P.	C.P.	In lab. 25 hrs. F... before adm.	C.G. an
1317	1911	427	C.B.	26	P.	C.P.	In lab. 71 hrs. Forceps	ical
1351	1913	375	H.S.	36	M.8, all forceps	C.P.	In lab. 16½ hrs. Forceps	ical
1352	1913	469	C.C.	26	M.3, all D.B.	C.P.	In lab. 20 hrs. F... before adm.	ical
1386	1915	272	M.M.	30	P.	C.P.	Head still above bri... 19 hrs. lab. Forceps	ical
1389	1915	345	N.S.	21	P.	C.P.	In lab. Memb. r... adm. Hand, foot an... prolapsed. After att... version, cephalotribe, ... clast and crotchet a... unsuccessfully	ical
1441	1917	575	A.L.	33	M.3, all forceps, D.B.	C.P.	In lab. 18 hrs. Forceps	ical
1499	1919	407	M.H.	26	P.	C.P.	In lab. 31 hrs. F... twice before adm.	ical
1518	1920	78	M.O.	27	M.3	C.P.	In lab. 17 hrs. F... applied 3 times before	ers C.G
1616	1914	1178		31	P.	C.P.	Long in lab. Forceps	ilk
1732	1918	1061		31	P.	C.P.	In lab. Forceps ... Perforation	ilk
1763	1920	19		23	P.	C.P.	In lab. Forceps ... Craniotomy. Uterus ...	esarea

Patient ... especia... Labour.	Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
hrs. I... 3 P.V.	...rus swabbed out with Tr. Int. C.G. and cont. C.G.	G.	G.	—	T. 100° for 4 days. Child had exophthalmos and R. sided facial paralysis
hrs. I...	...rus swabbed out with Tr. Abd. cavity packed before ...ng uterus. Int. C.G. and C.G.	G.	G.	—	Normal P. and T., but on 6th day pus discharged from lower end of wound
hrs. I... dm. H... ost ton... 60	C.G. and cont. C.G.	D.	D.B.	D. on 5th day from peritonitis	—
emb. r... before ...	C.G. and cont. C.G.	G.	G.	—	P. 120 for 14 days. T. 101° for 3 days, and after to 100° at times. Wound suppurated in two small areas
hrs. I... Forceps	C.G. and cont. C.G.	D.	D.B.	D. on 9th day from septic peritonitis	Fœtus much injured by forceps
hrs. I... Forceps ... m comm...	C.G. and cont. C.G.	G.	G.	—	Pus from abd. wound on 6th day, and lochia offensive from 4th day. T. 100°—101° for 14 days
hrs. I... Forceps ... now ½ ...	C.G. and cont. C.G.	G.	G.	—	P. 100—110 for 14 days. Pyrexia for 14 days. Lochia purulent for 7 days
hrs. I... omiting ... rvix no...	C.G. and cont. C.G.	D.	D.B.	D. few hrs. after op. Pt. collapsed and did not rally from op.	Fœtus severely injured by forceps
Forceps	C.G. and cont. C.G.	G.	G.	—	Pt. bronchitic. 5 days after op. wound opened up a little but healed
days. I...	C.G. and cont. C.G.	G.	G.	—	Wound opened 3rd day; fœtid fluid discharged. Free purulent discharge from localized peritonitis
hrs. I...	C.G. and cont. C.G.	G.	G.	—	Afebrile. Drainage tube left in for 3 days
Forceps	...ical	G.	D.B.	—	—
Forceps	...ical	G.	G.	—	Child very feeble at first
hrs. F...	...ical	G.	G.	—	Satisfactory
...ove brin... Forceps ... emb. r... foot and ... fter atte... alotribe, ... otchet a...	...ical	G.	G.	—	Good deal of suppuration from the wound
	...ical	G.	D.B.	—	Small amount of pus from wound on 6th day
Forceps	...ical	?	D.B.	—	Pneumonia. Empyema (op. 48th day). Lower end of wound septic. Abd. distended. Laparotomy 34th day
hrs. F... dm.	...ical	D.	D.B.	D. 6 days later from puerperal septicæmia	Peritonitis and septic endometritis
hrs. F...	...ers C.G.	G.	G.	—	Abd. wound suppurated. Infant feeble, facial paralysis
es before ... Forceps	...ilk	G.	G.	—	—
Forceps	...ilk	G.	D.B.	—	Febrile
Forceps ... Uterus	Cæsarean-hysterectomy	D.	D.B.	D. 3 hrs. after op. Collapse	—

No.	Year.	Reg. No.	and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at of Operation, especial regards Labour.
1785	1920	732		31	M.1, forceps, D.B.	C.P.	In lab. Memb. Forceps before adm.
1798	1920	1469		38	M.8, forceps	C.P.	In lab. Memb. Attempts at delivery
1807	1911	245		25	P.	C.P.	In lab. 24 hrs. F applied after manual tion
1811	1911	992		32	P.	C.P.	In lab. Forceps failed Os ½ dilated
1956	1916		E.N.	31	M.3	C.P., D.C. 3¼	Lab. advanced. F before adm.
1996	1916		G.K.	23	P.	C.P., E.C. 7	In labour 18 hrs. F before adm.
2023	1917		A.B.	28	P.	C.P.	Lab. advanced. F before adm.
2026	1918		M.V.	23	P.	C.P.	Prolonged lab. F and version before adm
2033	1920		N.R.	36	M.1, D.B.	C.P., E.C. 6½	In lab. 7 hrs. Memb Forceps before adm.
2116	1917		M.G.	26	P.	C.P., EC. 7¼	Forceps before adm.
2119	1917		E.M.	32	P.	C.P.	Forceps before and adm.
2176	1920		A.W.	41	P.	C.P., D.C. 4¼	Memb. rupt. Forceps adm. Several P.V.s op. Face present.
2179	1920		L.E.	31	P.	C.P., E.C. 7¼	Forceps in hosp. befo
2184	1920		J.B.	28	P.	C.P., E.C. 7	Forceps before and adm. Much laceratio vulva and vagina
2196	1920		E.L.	30	M.3, 1 D.B.	C.P., E.C. 7	Two attempts with f in hosp.
2218	1920	40617	A.B.	31	P.	C.P., D.C. 3½	In lab. 4 days. Sho sepsis present. Perfo before adm.
2276	1915	40457	S.S.	28	——	C.P., D.C. 3¾	In lab. 3 days. Head brim. Os=⅗ on Forceps failure
2320	1911	1252	H.B.	27	M.1, D.B	C.P., DC. 4	In lab. 3 days. O on adm. Forceps in
2326	1911	50	A.A.	26	P.	C.P., C.V. 3	In lab. 12 hrs. rupt. 3 hrs. Head brim. Forceps failed
2387	1918	5035	M.R.	30	—	C.P.	Transverse present. Pr attempts at delivery
2434	1912		R.	27	—	C.P., C.V. 3½	Forceps before adm.
2455	1913	189	L.S.	26	P.	? C.P.	In lab. 48 hrs. rupt. Os full. De bag. Forceps failed
2483	1917		D.L.	24	P.	C.P.	In lab. 24 hrs. F before adm.
2606	1914	171	D	30	P.	C.P.	Forceps repeatedly adm.
2608	1914	365	B.	28	P.	C.P.	In lab. 38 hrs. F repeatedly before adm
2685	1915	1477	H.B.	41	M.9, 4 forceps	C.P.	Forceps failed
2688	1915	1570	S.E.	40	M.2, both Cæs. sect.	C.P.	Forceps failed
2837	1917	166	M.H.	35	M.1.	C.P., D.C. 3¾	Mitral stenosis. Ind with bougies. In lab. 10 P.V.s. Forceps fa
2872	1913		A.M.	24	P.	C.P., D.C. 4¼	In lab., induced. F before adm.

Technique.	Result. Mother.	Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
silk	G.	G.	—	Pyrexia 2 days
silk	G.	G.	—	Sl. pyrexia
silk	G.	G.	—	Pyrexia 3rd and 8th day
silk	G.	G.	—	—
yers C.G.	G.	D.B.	—	Pyrexia 1 week, highest 102°
yers C.G.	G.	G.	—	Afebrile
yers C.G.	G.	D.B.	—	Pyrexia 7 days
yers C.G.	G.	D.B.	—	Pyrexia 7 days
yers C.G.	G.	G.	—	Afebrile
yers C.G.	G.	G.	—	Febrile
yers C.G.	D.	G.	D. 5 days after op. from general peritonitis	—
yers C.G.	D.	D.	D. on 5th day of septic peritonitis	Child had patent foramen ovale
yers C.G.	D.	D.	D. on 9th day of septic peritonitis	Child lived 1 hr.
and S.W.G.	G.	G.	—	Puerperal sepsis
yers C.G.	G.	G.	—	—
S.W.G.	G.	D.B	— —	Pyrexia from 9th to 18th day. Fœtus macerated
yers C.G.	G.	D.B.	—	Pyrexia 6 days. Child: Heart beating well, only gave several gasps
yers C.G.	D.	G.	D. on 6th day. Puerperal septicæmia. General peritonitis	Child feeble at first; artificial resp. Facial paralysis
yers C.G.	G.	G.	—	Afebrile
s. sect. followed by subtotal erect. on account of badly ated uterus	G.	D.B.	—	Pyrexia during 2nd week
yers C.G.	G.	G.	—	Afebrile
yers C.G.	D.	D.B.	D. on 6th day from septicæmia	Permission for hysterect. refused
sect. and subtotal hysterect.	G.	D.B.	—	—
-perit.	G.	G.	—	Febrile. Abd. wound suppurated. Sinus formed leading into uterine cavity
-perit.	G.	G.	—	Phlebitis both legs. T. 103°
S.W.G.	G.	G.	—	—
S.W.G.	G.	D.B.	—	—
S.W.G.	G.	G.	—	Afebrile
ilk	C	G.	—	Pyrexia 10 days. Offensiv vaginal discharge 1 month. Tender pelvic mass which gradually dispersed

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at of Operation, especial regards Labour,	Tech
2908	1914	3095 E.M.	21	P.	C.P., D.C. $3\frac{3}{4}$	In lab. 9 hrs. Memb Forceps twice	silk
2921	1919	234 L.O.	20	P.	C.P.	In lab. 7 days. rupt. Twice had forc	silk
3028	1918	G.W.	46	M.1.	C.P., E.C. 7	In lab. 12 hrs. forceps failed	silk
3117	1920	H.	21	P.	C.P.	In lab. 20 hrs. Forceps	silk
3123	1914	A.T.	32	M.1	C.P.	In lab. 3 days. rupt. 2 days. Hea engaged. Forceps fai	vers C.G
3124	1914	K.H.	23	P.	C.P.	In lab. 36 hrs. Forceps	vers C.G
3125	1915	B.B.	38	P.	C.P.	In lab. 2 days. F before adm.	vers C.G
3128	1919	N.W.	34	M.1	C.P.	In lab. 20 hrs. F failed twice. Head im	vers C.G
3129	1913	A.N.	25	P.	C.P.	In lab. 24 hrs. F before adm.	vers C.G
3142	1915	M.H.	30	P.	C.P.	Forceps before adm.	vers C.G
3144	1919	E.P.	21	M.1, craniotomy	C.P.	Forceps before adm.	
3145	1913	S.C.	33	P.	C.P.	Forceps before adm.	vers C.G
3158	1915	M.R.	29	M.2, forceps	C.P., D.C. 4	Lab. induced. Forceps	ers C.G.
3170	1920	62 L.Mc	37	P.	C.P., D.C. $4\frac{3}{4}$	In lab. 4 days. attempts at forceps adm.	vers C.G.
3201	1913	1970 L.J.	36	P.	C.P., D.C. 4	In lab. 36 hrs. Nu P.V. Forceps before	silk
3204	1914	2525 L.E.	44	P.	C.P., D.C. 4	Memb. rupt. 3 Numerous P.V. F before adm. T. 101°.	sect. a
3209	1918	M.C.	30	M.10, all forceps	C.P., D.C. $4\frac{1}{2}$	In lab. 8 hrs. F before adm.	silk
3211	1919	A.B.	34	M.4, all forceps	C.P., D.C. $4\frac{1}{2}$	In lab. 24 hrs. F before adm.	silk
3214	1920	990 M.B.	31	M.1, forceps, D.B.	C.P., D.C. 4	In lab. 6 hrs. F before adm. Brow p	silk
3220	1920	3321 E.Y.	22	P.	C.P., D.C. $3\frac{3}{4}$	In lab. 36 hours. F before adm. Septic. T P. 132	C.G.
3226	1912	L.H.	17	P.	C.P., T.C. $2\frac{1}{2}$	Craniotomy day adm. Head could n delivered	silk and
3258	1916	S.S.	37	—	C.P.	In lab. 30 hrs. Forceps	silk an
3264	1919	E.G.	39	—	C.P.	Forceps failed	sect. a
3268	1912	75 M.G.	27	M.2	C.P.	In lab. 25 hrs. Forceps	
3270	1917	3/119 M.S.	25	M.1, forceps, D.B.	C.P., D.C. 4	In lab. 17 hrs. fully dilated. Forceps	silk
3314	1914	W.	29	P.	C.P., D.C. $3\frac{1}{2}$	Memb. rupt. 14 hrs op. Forceps before a	and con
3407	1913	343 J.T.	38	P.	C.P.	Forceps before adm.	silk
2411	1920	7168 J.C.	27	?	C.P., C.V. $3\frac{1}{4}$	In lab. 3 days. rupt. 2 days. Forceps	
3384	1913	13/1550 E.J.	38	?	C.P.	In lab. several Many P.V. and ma tions. Craniotomy fa	
474	1919	1587 E.H.	28	P.	C.P., D.C. 4	56 hrs. in lab. before adm.	vers C.G
2762	1913	J.E.	34	P.	C.P.	3 days in lab. before adm. Complet of perineum	silk

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
silk	G.	G	—	T. 103° 3rd day, fell slowly to normal
silk	D.	G.	D. on 3rd day from pneumonia	—
silk	G.	D.B.	—	T. 101° on 5th day. Erysipelas of face 8th day. T. 102.5°
silk	G.	G.	—	Slight pyrexia 3rd week
yers C.G.	D.	D.B.	D. 3rd day	—
yers C.G.	G.	G.	—	Sl. suppuration and T.
yers C.G.	G.	G.	—	Pyrexia 3 weeks
yers C.G.	D.	D.B.	D. 6th day from embolism and sepsis	Collapsed after op. Rigor 3rd day
yers C.G.	G.	G.	—	Sl. pyrexia 11 days. Child facial paralysis
yers C.G.	D.	—	D. 5th day	—
	G.	G.	—	—
yers C.G.	G.	G.	—	Sl. suppuration
yers C.G.	D.	G.	D. 20th day from peritonitis	16th day abd. reopened for peritonitis and drained
yers C.G.	G.	G.	—	—
silk	G.	D.B.	—	
sect. and hysterect.	D.	G.	D. 48 hrs. after op. from sepsis	—
silk	G.	G.	—	Afebrile
silk	G.	G.	—	Pyrexia 6 days
silk	G.	G.	—	Pyrexia 10 days
C.G.	D.	G.	D. on 8th day from sepsis	—
silk and cont. silk	D.	D.B.	D. next day. "Exhaustion"	—
silk and cont. silk	G.	D.B.	—	Afebrile
sect. and hysterect.	G.	D.B.	—	Afebrile
	D.	G.	D. 10th day from pneumonia	2 days after op. signs of pneumonia in R. lung, D. 8 days later
silk	G.	D.B.	—	Pyrexia from 7th to 13th day. Fœtus had fractured skull
and cont. silk	D.	D.	D. 3rd day. Septic peritonitis	Child lived 10 mins.
silk	G.	D.	—	Afebrile
—	G.	G	—	Afebrile. Child had facial paralysis
—	D.	D.B.	D. 48 hrs. later. Shock and septicæmia	—
yers C.G.	G.	D.B.	—	Pyrexia 4 days
silk	G.	D.	—	—

Table XI.—CÆSAREAN SECT

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient ... of Operation, especi... regards Labour
630	1911	44 G.	30	M.5, 3 D.B.	C.P., C.V. $3\frac{1}{4}$	Bag inserted, bu... would not come ... 24 hrs. in lab.
660	1911	1325 H.	?	M.4	C.P.	Induction 3 days ... op. 5 hrs. in lab.
964	1919	10 L.	26	M.2, 1 Cæs. sect.	C.P., C.V. $2\frac{3}{4}$	Elbow presenting. ... Bougies twice inserte...
1017	1911	51 M.G.	39	M.7—all forceps, 2 living	C.P., D.C. $4\frac{1}{4}$	2 bougies inserted ... before op. Memb. rup... pains. 38 weeks preg...
1337	1912	628 E.D.	35	M.2, both forceps, D.B.	C.P.	3 bougies inserted ... before op. In lab.
1357	1913	581 M.C.	44	M.3, 2 forceps, D.B.	C.P.	Bougies introduced ... before op. Difficult ...
1361	1914	77 M.T.	33	M.2, 1 D.B.	C.P.	Induction. Cæs. ... hrs. after lab. began. ... rupt.
1384	1915	252 M.B.	32	M.2, 1 forcepe, D.B., 1 induction	C.P.	Induction. Onset ... No engagement after ... lab.
1397	1916	31 M.W.	32	M.1, forceps, D.B.	C.P.	Induction at 8 ... Membs. rupt., 72 h... onset of lab. He... advanced
1407	1916	362 N.S.	22	M.1, Cæs. sect. after craniotomy	C.P.	Induction of lab. ... before op. Membs. ...
1453	1918	188 E.C.	33	M.6, 4 D.B., 2 induction	C.P.	Induction. Cæs. ... hrs. later
1529	1920	232 J.E.	27	P.	C.P.	Induction 3 days ... Cæs. sect. Breech ... Prolapsed cord. ... rupt.
1554	1920	586 S.K.	30	M.2, 1 forceps, 1 induction	C.P.	Induction of lab. ... before op. Full d... for 3 hrs.
1556	1920	666 E.G.	33	M.3, 3 forceps—2 D.B.	C.P.	Induction of lab. ... before op. In lab. ... Head did not advan...
1557	1920	673 F.H.	35	M.2, both forceps—1 D.B.	C.P.	Induction at 34... 3 days before op. ... did not advance
1768	1920	109	37	M.3, 1 craniotomy, 1 induction	C.P.	In lab. after in... Fœtal distress
2300	1913	41030 A.S.	39	?	C.P., D.C. $3\frac{1}{2}$	In lab. 36 hrs. ... Bag inserted. Me... Fœtal distress
2306	1912	41308 G.S.	21	P.	C.P., D.C. $4\frac{1}{4}$	In lab. 60 hrs. ... rupt. Os = $\frac{1}{2}$. Bag ...
2516	1920	H.C. 304 P.C.	33	P.	C.P.	At 37th week. O... after induction by ... and 48 hrs. after ... lab. Os = $\frac{3}{4}$. Me... Version had been at...
2615	1916	16 McR.	34	M.5. 2 D.B.	C.P.	Bougies passed ... before op. Lab. for ... No progress. T. 10...

...TER INDUCTION OF LABOUR.

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
...lk	G.	G.	—	—
...lk	D.	G.	D. 3 days ? Sepsis	Evidence of old peritonitis during op., *e.g.*, dense adhesions
...rs C.G.	G.	G.	—	—
...rs C.G.	G.	G.	—	Normal. P. 108 on 3rd only
...rs C.G.	G.	D.	—	Child lived 2 days. Head badly hurt
—	G.	G.	—	Abd. wound suppurated
...rs C.G.	G.	G.	—	—
...rs C.G.	G.	G.	—	—
...rs C.G.	G.	G.	—	—
...rs C.G.	G.	D.	—	Great strain on previous C.S. scar. Abd. wound sepsis. Child D. 6 weeks old
...rs C.G.	G.	G.	—	Satisfactory
—	D.	G.	D. 10 days later. Pneumonia and sepsis	—
...rs C.G.	G.	G.	—	Satisfactory
—	D.	G.	D. 4 days later. Sepsis	—
...rs C.G.	G.	G.	—	Satisfactory
...rs C.G.	G.	D.B.	—	Slightly febrile
In lab. 36 hrs. Os=2/1.	G.	G.	—	Afebrile
	G.	G.	—	T. 101° for 10 days
...rs C.G.	G.	G.	—	Intermittent. Temp. for 2 weeks, but good recovery
...rs C.G.	G.	G.	—	T. 103° on 2nd day. Normal on 8th

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at of Operation, especial regards Labour.	Techn
2669	1914	982 E.M.	32	M.1, craniotomy	C.P.	Induced with bougi hrs. previously. Head brim	S.W.G.
2673	1914	1061 S.P.	28	M.3, 2 forceps, 1 craniotomy	C.P.	Induced 2 days previ Membs. rupt. In 2nd	S.W.G.
2676	1914	1123 M.G.	40	M.6, 2 induction	C.P.	Induced twice 4 days viously. Head above Membs. rupt.	S.W.G.
2717	1919	2755 A.H.	35	M.6. all forceps	C.P.	Induction with bougi hrs. previously. M rupt.	S.W.G.
2731	1920	3014 E.L.	37	P.	C.P.	In lab. 48 hrs. Os= Ribe's bag introduced, h and left in during op.	S.W.G
2819	1914	620 R.	30	M.1, craniotomy	C.P., D.C. $4\frac{1}{2}$	Bougies, then bag, in 53 hrs. before op. Wa posn. 7 P.V.	C.G. and
2837	1917	166 M.H.	35	M.1, forceps	C.P.	Induction of lab. bougies 48 hrs. befor Membs. rupt. Os fu P.V.s. Forceps failed	S.W.G.
2872	1913	A.M.	24	P.	C.P., D.C. $4\frac{1}{4}$	In lab. 8 hrs., in Forceps failed. T. 10 4 days before op.	ilk
2873	1912	R.C.	25	Not stated	C.P., D.C. $3\frac{3}{4}$	In lab. (induced)	ilk
2881	1916	108 R.M.	22	P.	C.P., D.C. $3\frac{3}{4}$	In lab. (induced) 1 T. 101°. P. 130. Pt exhausted	ilk
2890	1916	3894 J.H.	39	M.3, 2 forceps, 1 induced	C.P., D.C. $4\frac{1}{4}$	Induced. Membs. r hrs. Hand presenting	ilk
2894	1917	3442 D.W.	30	M.1	C.P., D.C. 4	Emergency. In lab. induced by outside Dr	ilk
2906	1915	A.N.	28	M.2, 1 forceps, D.B.	C.P., D.C. 4	In lab. (induced) 8 h	ilk
2910	1914	1353 H.B.	25	P.	C.P., D.C. $3\frac{7}{8}$	In lab. (induced) 2	ilk
3158	1915	M.R.	29	M.3, 2 forceps	C.P., D.C. 4	Membs. rupt. 12 hrs. Lab. induced. Forceps	
3165	1919	I.M. 180 F.D. 1919	33	M.3, 2 forceps	C.P.	Lab. induced with b Head did not engage	ers C.G
3292	1916	66 G.E.	31	P.	C.P.	In lab. about 24 hrs induction. At least	ers C.G
3403	1919	466 D.M.	30	P.	C.P.	Lab. induced. Weak Failed. Memb. rupt. sect. after 3 days	S.W.G.

Technique.	Result. Mother.	Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
S.W.G.	G.	G.	—	—
S.W.G.	G.	G.	—	Slight rise of T. on 2nd day for a week
S.W.G.	G.	G.	—	—
S.W.G.	G.	G.	—	—
S.W.G	D.	G.	D. 48 hrs. later. General peritonitis	No definite localized symptoms. Some jaundice, distension and vomiting. P. rose from 112, 1st day, to 136—144 at D. T. never above 98
C.G. and silk	G.	G.	—	Uneventful
S.W.G.	G.	G.	—	Uneventful
silk	G.	G.	—	T. raised for 10 days. Offensive vag. disch. Tender mass in pelvis
silk	G.	G.	—	Slight T. for few days
silk	D.	D.B.	D. 7 days. Septicæmia	—
silk	D.	D.B.	—	T. 100.8° 2nd day. Uneventful recovery
silk	G.	G.	—	Uneventful
silk	G.	G.	—	T. rose to 101° on 4th day
silk	G.	G.	—	T. 101° during onset of lab. raised for 5 days.
	D.	G.	D. 20th day. Peritonitis	Abd. opened and drained on 16th day for peritonitis and ileus
ers C.G.	G.	G.	—	Pouch of Douglas drained on 3rd day for pelvic peritonitis
ers C.G.	G.	G.	—	Irreg. pyrexia between 97.8°—101.2° for first 15 days
S.W.G.	G.	G.	—	Slightly febrile, 99°—100°

Table XII.—LOWER UTERINE

No.	*Year.*	*Reg. No.*	*and Name.*	*Age.*	*No. and Details of Previous Labours.*	*Indication.*	*Condition of Patient at of Operation, especially regards Labour.*	*Tech*
642	1911	441	J.M.	25	P.	C.P., C.V. $3\frac{1}{4}$	Os=2/6	a-perit.
661	1911	915	M.	28	P.	C.P., C.V. $3\frac{1}{4}$	Os=1/-. In lab. Mem rupt.	a-perit.
665	1911	1118	S.	22	M.1, forceps, D.B.	C.P., C.V. $2\frac{3}{4}$	Early in lab.	a-perit.
680	1912	185	N.	37	P.	C.P., C.V. 3	8 hrs. in lab. Mem tact. Pt. fatigued	a-perit.
770	1914	224	M.	21	P.	C.P., C.V. 3	Meb. rupt. 4 days. strong for 3 days	a-perit. uze dra
771	1914	251	M.	35	M.3	C.P., C.V. $3\frac{1}{4}$	In lab. 4 days. rupt. 3 days	a-perit.
847	1916	F.		40	P.	C.P., C.V. $3\frac{1}{2}$	Early in lab.	S. 2 la
850	1916	522	N.	25	M.3, 1 Cæs. sect.	C.P., C.V. $2\frac{3}{4}$	Pains began 12 hrs. bef	S. 2 la
874	1916	1085	D.	24	M.1, craniotomy	C.P., C.V. $3\frac{1}{2}$	Not in lab.	S. 2 la
875	1916	1130	B.	?	M.1, forceps, D.B.	C.P., C.V. $3\frac{1}{4}$	In lab. No. P.V.	S. 2 la
886	1917	582	L.	34	1 normal	C.P., C.V. $3\frac{1}{2}$	Os full. Memb. rupt. presenting	a-perit.
888	1917	378	B.	24	P.	C.P., C.V. $3\frac{1}{4}$	Os full. Memb. intact	S.
909	1918	339	G	28	P.	?	Os full	S. 2 la
915	1918	576	I	38	3 ch.	?	In lab.	S. 2 la
949	1918	1304	McC.	24	M.1, forceps, D.B.	C.P., C.V. $3\frac{1}{4}$	?	S. 1 sil
950	1918	1358	O'B.	30	M.2, 1 Cæs. sect. 1 craniotomy	C.P.	In lab.	S. 1 sil
953	1918	1446	A.	28	M.2	C.P.	In lab.	S. 1 sil
954	1918	1505	S.	21	P.	C.P., C.V.3	Os full. Memb. rupt.	S. 1 sil
955	1918	1507	L.	36	M.1, craniotomy	C.P., C.V. $3\frac{1}{4}$	Os=$\frac{2}{3}$	S. 1 sil
978	1919	459	P.	29	M.3, 2 inductions	C.P., C.V. $3\frac{1}{4}$	In lab. 11 hrs.	S. 1 sil
993	1919	1520	McD.	30	M.4, all forceps	C.P., C.V. $3\frac{1}{4}$	Memb. rupt. 19 hrs. bef	S. 1 sil
994	1919	1556	T.	26	P.	C.P., C.V. $2\frac{3}{4}$	In lab. 40 hrs. Os=1/-	S. 1 sil
2204	1920	46198	C.M.	38	P.	C.P.	Not in lab.	S. Con
2205	1920	45991	R.H.	40	1 D.B.	C.P., D.C. $3\frac{1}{2}$	Not in lab.	S. 3 la
2564	1917		M.H.	36	M.1, craniotomy	C.P., C.V. 6 cm.		S. Int.
2567	1917		N.S.	25	P.	C.P., C.V. $8\frac{1}{2}$ cm.	——	S. Int.
2606	1914		D.	30	P.	C.P.	Forceps failed before	a-perit.
2607	1914		S.	38	M.1, D.B.	C.P., D.C. $3\frac{1}{4}$	Tonic contraction of Very large child	a-perit.
2608	1914		B.	28	P.	——	In lab. 38 hrs. Re failures with forceps adm.	a-perit.
2612	1915	299	B.	35	M.3, 1 craniotomy	C.P., D.C. 3	In lab. 15 hrs. S vag. exams.	a-perit.
2633	1918	525	C.	20	P.	C.P., C.V. $2\frac{3}{4}$	In lab. 48 hrs. Me coming away	a-perit.,
2803	1920	31	A.F.	23	P.	C.P.	In lab. Memb. 1 vag. exam.	a-perit.
2804	1920	266	E.C.	32	M.2, both Cæs. sect.	C.P.	In lab. 5 hrs.	S.

ERIGMENT OPERATION.

Technique.	Result. Mother.	Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
a-perit. 2 layers cont. C.G.	G.	G.	—	Sl. pyrexia 12 days
a-perit. 2 layers cont. C.G.	G.	G.	—	Pyrexia 6 days
a-perit. 2 layers cont. C.G.	G.	G.	—	—
a-perit. 2 layers cont. C.G.	D.	G.	D. under anæsthetic. Cardiac failure	—
a-perit. 2 layers cont. C.G. uze drain	G.	D.	—	Pyrexia 5 days
a-perit. 2 layers cont. C.G.	D.	G.	D. 16 hrs. after op.	Great deal of vomiting after op.
S. 2 layers C.G.	G.	G.	—	—
S. 2 layers C.G.	G.	G.	—	—
S. 2 layers silk	G.	G.	—	3 days pyrexia
S. 2 layers silk	G.	G.	—	—
a-perit.	G.	G.	—	—
S.	G.	G.	—	5 days pyrexia
S. 2 layers int. silk, 1 C.G.	G.	G.	—	Pyrexia 10 days. Bronchitis
S. 2 layers int. silk, 1 C.G.	G.	G.	—	Afebrile
S. 1 silk, 1 C.G.	D.	G.	D. 5th day	Pyrexia 4 days
S. 1 silk, 1 C.G.	G.	G.	—	Afebrile
S. 1 silk, 1 C.G.	G.	G.	—	Afebrile
S. 1 silk, 1 C.G.	G.	G.	—	Pyrexia 12 days
S. 1 silk, 1 C.G.	G.	G.	—	Afebrile
S. 1 silk, 1 C.G.	G.	G.	—	Afebrile
S. 1 silk, 1 C.G.	G.	G.	—	Afebrile
S. 1 silk, 1 C.G.	G.	G.	—	Afebrile
S. Cont. silk	G.	G.	—	Afebrile
S. 3 layers cont. C.G.	G.	G.	—	T. 101°, 7th and 8th days
S. Int. silk. C.G. for perit.	G.	G.	—	Afebrile
S. Int. silk. C.G. for perit.	G.	G.	—	Afebrile
a-perit.	G.	G.	—	Highest T. 102°. Abd. wound suppurated. Sinus formed leading into uterine cavity
a-perit.	D.	D.B.	D. on 5th day from sepsis	—
a-perit.	G.	G.	—	Phlebitis both legs. T. 103°
a-perit.	G.	G.	—	T. 101°, 2nd day, otherwise afebrile
a-perit., with drain	D.	G.	D. on 5th day from sepsis	—
a-perit.	G.	G.	—	Pyrexia 10 days. Œdema of left leg
S.	G.	G.	—	—

Table XIII—CÆSAREAN SECTION FOLLOW

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at Operation, especially as regards Labour.	Tech
65	1913	95 E.M.	29	M.3, all Cæs. sect.	C.P.	Not in lab.	...s. sect. erect.
187	1915	715 F.S.	25	P.	C.P., D.C. 4	Conval. from rheu... fever	...s. sect. erect.
209	1915	1278 A.B.	26	M.2, both Cæs. sect.	C.P., D.C. 3½	Not in lab.	...s. sect. erect. an
219	1916	144 E.H.	34	M.4, all Cæs. sect.	C.P., D.C. 3½	In lab. 18 hrs Achon... plasia	...s. sect. erect. an
236	1916	509 O.H.	29	M.1, Cæs. sect.	C.P.	Not in lab.	...s. sect. erect. an
239	1916	555 J.E.	30	M.4, all Cæs. sect.	C.P.	Not in lab.	...s. sect. erect. an
258	1916	1082 M.H.	30	M.3, all forceps, D.B.	C.P.	Os=2/-	...s. sect. erect. an
306	1917	625 L.E.	35	M.3, all Cæs. sect.	C.P.	Not in lab.	...s. sect. erect. an
513	1920	518 E.G.	25	M.2, both Cæs. sect.	C.P., D.C. 3½	Not in lab.	...s. sect. erect. an
672	1911	1293 C.	25	M.2, 1 Cæs. sect.	C.P., C.V. 2¾	Not in lab.	Sect. a...
691	1912	440 D.	24	P.	C.P., C.V. 2	Lab. just begun	...s. sect indiceect...
695	1912	732 W.	30	P.	C.P., C.V. 2¾	Os=1/-. Memb. rupt.	...sect. an...
842	1916	175 S.	35	M.2, 1 Cæs. sect., 1 craniotomy	C.P.	Os=¾. Memb. intact	...sect. an...
846	1916	353 P.	36	M.1, Cæs. sect.	C.P., C.V. 2½	Not in lab.	...sect. an...
916	1918	588 G.	33	M.8	?	?	...sect. an...
1025	1911	338 A.B.	30	P.	C.P., D.C. 4	In lab. 10 hrs. Memb. ... 2 P.V.	...sect. an...
1062	1914	9 M.B.	33	M.2, both Cæs. sect.	C.P., D.C. 3½	8 months preg. Not ... No. P.V.	...s. sect. erect. a... Repai...
1066	1914	90 L.F.	31	M.1	C.P., D.C. 3½	Term. In lab. ?2 ... cut ... Transv. presentation. ... rect. d... contraction. Pt. very ... s first lapsed	
1108	1915	222 R.W.	26	P.	C.P., D.C. 3¼	Term. In lab. ... ...s. sect. Bandl's ring. Rupt. ... with r...	
1117	1915	332 H.T.	38	M.9	C.P.	Term. In lab. ... ...sect. an... Memb. rupt.	
1183	1917	393 E.H.	32	M.1, forceps, D.B.	C.P.	Term. In lab. 2 P.V. ... ...s. sect. purulent discharge	...a uter... d
1195	1918	104 C.J.	40	P.	C.P. & fibroid	Term. In lab. 8 hrs. ... ...s. sect. not rupt. 4 P.V.	Many ...e wall
1241	1919	344 B.B.	35	P.	C.P.	In lab 14 days. Memb. ... ...sect. ar... Almost tonic contracti...	
1264	1920	64 E.T.	38	M.4, 1 craniotomy, 3 Cæs. sect.	C.P., D.C. 3½	In lab. 4 hrs. ... ...sect. an... unrupt. 38 weeks preg.	
1313	1911	295 M.H.	41	M.8	C.P.	Not in lab.	...sect. an...
1501	1919	451 B.C.	30	M.3, 2 Cæs. sect.	Spontaneous rupt. of uterus after 2 previous Cæs. sects.	Irreg. pains for 1 ... ...sect. an... severe on day before ... 36 weeks	

LLOWED BY HYSTERECTOMY.

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
s. sect. followed by subtotal erect.	G.	G.	—	Pyrexia first 7 days. Uterine scars found thin and weak at op
s. sect. followed by subtotal erect.	G.	D.B.	—	Fœtus macerated. Slight pyrexia 14 days
s. sect. followed by subtotal erect. and removal of apps.	G.	D.	—	Child, congenital heart. Irregular pyrexia 10 days
s. sect. followed by subtotal erect. and removal of apps.	G.	G.	—	Afebrile
s. sect. followed by subtotal erect. and removal of apps.	G.	G.	—	Afebrile
s. sect. followed by subtotal erect. and removal of apps.	G.	G.	—	Afebrile
s. sect. followed by subtotal erect. and removal of apps.	G.	G.	—	Phlegmasia
s. sect. followed by subtotal erect. and removal of apps.	G.	D.	—	Pyrexia 3 days
s. sect. followed by subtotal erect. and removal of apps.	G.	G.	—	Pyrexia 5 days
Sect. and subtotal hysterect.	G.	G.	—	Old scar very thin; only thickened peritoneum. Many adhesions
s. sect., hysterect. and ndiceectomy	G.	G.	—	Purulent vaginal discharge (staph. albus and B. coli present)
sect. and hysterect.	D.	G.	D. 9th day	Continuous pyrexia
sect. and hysterect.	G.	G.		Many adhesions; wall flabby. Uterus removed
sect. and hysterect.	D.	G.	D. 9th day. Peritonitis	Peritonitis. Bowels matted together
sect. and hysterect.	D.	G.	D. within 48 hrs. No cause stated	—
sect. and hysterect.	G.	D.B.	—	Afebrile. Fœtus macerated. Hysterect. done because fibroid
s. sect. followed by subtotal erect. and removal of left Repair of hernia	G.	D.	—	Child D. in 2 hrs. T. 99°—100° for 10 days, then after rising to 101° for 3 days fell to normal
n cut off and subtotal rect. done without opening first	D.	D.B.	D. on 9th day from acute broncho-pneumonia and septicæmia	—
t. sect. and subtotal hysterect. with removal of apps.	G.	G. D.	—	T. 99°—100°. P. 100 for 10 days, then normal. 2nd fœtus was D. large tear in uterus ust above cervix
sect. and subtotal hysterect.	G.	?	—	Afebrile
s. sect. and subtotal hysterna uterine wall looked in-	G.	G.	—	Afebrile
sect. and subtotal hyster- Many fibroids found in e wall	G.	G.	—	Afebrile
sect. and hysterect.	G.	D.B.	—	Afebrile
sect. and subtotal hysterect.	G.	G.	—	T. 101°—100° 3rd and 4th day
sect. and subtotal hysterect.	G.	G.	—	—
sect. and subtotal hysterect.	G.	D.B.	—	Afebrile

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication	Condition of Patient at ... of Operation, especially as regards Labour.
1641	1915	588	26	M.5	C.P.	Long in lab.
1712	1917	1569	27	P.	C.P.	——
1763	1920	19	23	P	C.P.	In lab.; forceps; cranio... Uterus rupt.
1792	1920	1209	25	M.4, 1 induced, D.B., 1 forceps, D.B., 1 Cæs. sect.	C.P.	Not in lab.
1818	1911	C.C.	27	P.	C.P.	2½ days in lab.
1821	1912	R.C.	42	M.3, all D.B.	C.P., D.C. 4½ (?)	In lab. Os slightly dila...
2387	1918	5038 M.R.	30	——	C.P.	Transv. present., ... present. Collapsed. Pre... attempts at delivery
2437	1911	206 E.M.	33	1. Forceps 2. Forceps, S.B. 3. Abortion (3/12) 4. C.S.	C.P.	In lab. 3-4 hrs. M... rupt. 2 P.V.
2483	1917	D.L.	24	P.	C.P.	In lab. 24 hrs. Fo... before adm.
2512	1920	270 F.H.	33	P.	C.P.	In lab. 36 hrs. O... Memb. rupt. About 10... before adm.
2520	1914	85 S.C.	32	M.3, 1 craniotomy, 2 Cæs. sects.	C.P.	Not in lab.
2528	1912	R.H.	23	P.	C.P.	In lab. 7 hrs. Rep... exams. Fœtus dead and
2578	1919	E.S.	39	P.	C.P.	In lab. early
2859	1919	541 R.G.	38	M.6, 4 forceps, D.B., 2 Cæs. sects.	C.P., D.C. 4	——
3016	1912	2171 E.T.	42	P.	C.P., D.C. 4 Fibroid, anterior wall of uterus	In lab. 8 hrs. Memb... Breech, prolapsed cord
3067	1920	E.E.C.	32	——	C.P.	In lab. 24 hrs. Obstr... lab.
3204	1914	2525 L.E.	44	P.	C.P., D.C. 4	Memb. rupt. 3 days. F... attempted before adm.
3221	1920	3754 A.R.	38	P.	C.P., D.C. 4	In lab. 6 hrs. Memb... Several P.V. Imp... breech
3272	1917	97 119 A.H.	37	M.1	C.P.	In lab. 6 hrs. Memb... first day. L. arm at ... shoulder impacted
3369	1910	R.A.	29	M.1, craniotomy	C.P., D.C. 3½	Term. Not in lab. No P...
3264	1919	E.G.	39	?	C.P.	Obstructed lab. F... failed. Fœtid liq. amn...

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
s. sect. and subtotal hysterect.	G.	G.	—	—
s. sect. and subtotal hysterect.	G.	G.	—	—
s. sect. and subtotal hysterect.	D.	D.B.	D. Collapse 3 hrs. after op.	—
s. sect. and subtotal hysterect.	G.	G.	—	Slight pyrexia
s. sect. and subtotal hysterect.	D.	?	D. of peritonitis 2 days after op.	—
Cæs. sect. followed by hysect. for myomata	G.	G.	—	Afebrile
Cæs. sect. followed by subtotal erect. on account of badly rated uterus	G.	D.B.	—	T. 101.2° during 2nd week
Cæs. sect. followed by subtotal sterect. on account of hæm. lowing excision of tubes to ilize	G.	G.	—	Slight pyrexia. "Incipient rupt. of uterus" noted at op.
s. sect. and subtotal hysterect.	G.	D.B.	—	Afebrile
Cæs. sect. and subtotal hysectomy on account of hæm. uterine inertia	D.	G.	Pt. nearly D. from hæm. during op., but was saved by hysterect. and blood transf. Septicæmia (strep. longus). D. on 14th day. P.M. Purulent pneumonia from multiple emboli, pelvic abscess, pericarditis, etc.	—
s. sect. and hysterect.	G.	G.	—	Pyrexia 7 days. The uterus was bicornuate. Two Cæs. sects were performed on L. horn and one on R. The scar in the L. horn was very thin, placental sinuses showing through peritonal covering
s. sect. and hysterect.	G.	D.B.	—	Slightly morbid. B.M.A. standard
s. sect. and hysterect.	G.	G.	—	Afebrile. At op. tuberculous abscess found pointing in pelvis; drained per vag.
Cæs. sect and subtotal hysect. Old abscess found in erine wall and adhesions of entum to anterior uterine wall	D.	G.	D. on 10th day. Pulmonary embolism. Abd. wound infected but healed, and stitches removed 9th day	—
s. sect. and subtotal hysterect.	G.	G.	—	4th day thrombosis. L. saphenous vein. 4th week R. femoral thrombosis. 4th to 5th week T. over 103° on four occasion. No pyrexia after 6th week
s. sect and total hysterect.	G.	D.B.	—	Irreg. T. for 4 weeks. Fœtus D. Cord several times round neck
s. sect. and subtotal hysterect.	D.	G.	D. 48 hrs. after op. from sepsis	—
s. sect. and subtotal hysterect.	G.	G.	—	Fibromyoma in ant. wall of uterus
Cæs. sect and subtotal hysect. Uterus septic	G.	D.B.	—	Abd. distension for a week. T. 103° on 15th day; fell on 17th to 100°. Wound discharging slightly. Healed
s. sect. and subtotal hysterect.	G.	G.	—	T. rose to 101° on 6th day, otherwise afebrile
s. sect. and hysterect.	G.	D.B.	—	Normal

Table XIV.—ECLAMPSIA HER

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient & of Operation, especially as regards Labour	Techn
1	1912	1048	19	P.	Eclampsia	—	median
2	1912	1417	17	P.	Eclampsia	—	median
3	1913	1697	30	P.	Eclampsia	—	median
4	1914	35	27	P.	Eclampsia	—	median
5	1914	1747	26	M.2	Eclampsia	—	median
6	1915	91	27	P.	Eclampsia	—	median.
7	1915	501	20	P.	Eclampsia	—	median
8	1915	546	23	P.	Eclampsia	—	median
9	1915	1149	44	M.4	Eclampsia	—	median
10	1915	1437	22	P.	Eclampsia	—	median
11	1915	1567	22	P.	Eclampsia	—	median
12	1915	1661	21	P.	Eclampsia	—	median
13	1915	1723	19	P.	Eclampsia	—	median
14	1915	1753	42	M.8	Eclampsia	—	median
15	1915	1780	24	P.	Eclampsia	—	median
16	1916	387	45	M.8	Eclampsia	—	median
17	1916	1283	26	P.	Eclampsia	—	median
18	1916	1433	26	P.	Eclampsia	—	media
19	1916	1475	30	P.	Eclampsia	—	median
20	1916	1682	25	P.	Eclampsia	—	median
21	1916	2017	23	P.	Eclampsia	—	median
22	1916	681	33	M.1	Eclampsia	Not in lab.	median
23	1917	46	33	M.3	Eclampsia	—	median
24	1917	303	26	P.	Eclampsia	—	median
25	1917	324	28	P.	Eclampsia	—	median
26	1917	717	31	P.	Eclampsia	—	median
27	1917	1546	29	M.2	Eclampsia	—	median
28	1918	517	38	M.4	Eclampsia	Not in lab.	median
29	1918	1091	24	P.	Severe toxæmia	Not in lab.	median
30	1918	1514	26	P.	Eclampsia	Not in lab.	median
31	1919	1212	22	P.	Eclampsia. Twins	In lab.	median
32	1919	1394	26	M.1	Albuminuria. Acute nephritis as a child	Paroxysm of cardia tress. Not in lab. A	median
33	1919	1560	34	P.	Eclampsia (24 weeks)	Not in lab. (comato weeks preg.	median
34	1919	1907	31	P.	Eclampsia	Not in lab. (comato	median
35	1920	89	28	P.	Eclampsia	Not in lab.	median
36	1920	273	24	P.	Eclampsia	Not in lab.	median
37	1920	336	24	P.	Eclampsia	In lab. (comatose).	median
38	1920	348	26	P.	Eclampsia	34 weeks preg. (co 14 fits before C.S.	median
39	1920	353	28	M.1	Eclampsia	28 weeks preg. 1 fi C.S. Comatose	median
40	1920	432	36	P.	Eclampsia	Not in lab. 6 fits bef	median
41	1920	498	32	P.	Albuminuria	Not in lab. 38 week no result after 4 hrs. t treatment	median
42	1920	591	20	P	Albuminuria	Not in lab. Pre-ec symptoms	median
43	1920	640	26	P.	Albuminuria	Not in lab. Men unrupt. 35 weeks pr	median
44	1920	679	43	M.7	Eclampsia	Not in lab. (full Unconscious B.P. 220	median

ER TOXÆMIAS.

Technique.	Result. Mother.	Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
median	G.	G.	—	—
median	G.	G.	—	—
median	G.	G.	—	—
median	G.	D.	—	—
median	G.	D.	—	—
median. Twins	G.	G. G.	—	—
median	G.	G.	—	—
median	G.	D.	—	—
median	G.	G.	—	—
median	G.	G.	—	—
median	G.	G.	—	—
median	G.	G.	—	—
median	G.	G.	—	—
median	G.	D.	—	—
median	G.	G.	—	—
median	G.	G.	—	—
median	G.	G.	—	—
median. Incision kidney	G.	D.	—	—
median	D.	G.	—	—
median	D.	D.B.	—	—
median	G.	G.	—	—
median	G.	G.	—	—
median	G.	G.	—	—
median	G.	G.	—	—
median	D.	G.	D. 20 hrs. after. P.M. fatty degeneration of liver. Kidneys pale. Hypostatic pneumonia at left base	—
median	D.	G.	D. 2 days later	
median	G.	G.	—	—
median and nephrotomy	G.	D.B.	—	—
median	G.	G.	—	—
median and nephrotomy	G.	G.	—	—
median	G.	D. D. 4 days	—	—
median	D.	D.	Œdema of lungs and uremia	—
median	G.	D. 5 hrs	—	—
median	D.	D.B.	D. 2nd day. No fits after op.	
median	G.	G.	—	—
median	G.	G.	—	—
median	D.	D.B.	D. 4 hrs. after op. Had 6 fits	
median	G.	G.	—	—
median	G.	D.	—	—
median	G.	D.	—	—
median	G.	D.	Child D., toxæmia some days after	—
median	G.	G.	—	Alb. still present on dischar.
median	G.	G.	—	—
median	D.	D.B.	2 fits 4–6 hrs. after. Jaundice, coma and death 12 hrs. after	—

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient ... of Operation, especi... regards Labou...	Techn...
45	1920	695	26	P	Albuminuria	32 weeks Not in ...	..., med. a... ...dney
46	1920	838	43	M.2	Eclampsia	Not in lab. Coma... fits before C.S.	...median
47	1920	1061	20	P	Albuminuria	Not in lab.	
48	1920	1362	28	M.1	Eclampsia	In lab. 10 fits bef... B.P. 225	...median ...median
49	1920	1384	31	P	Albuminuria	Not in lab.	
50	1919	1573	27	P	Albuminuria	In lab.	...median
51	1920	847	24	P.	Albuminuria	Not in lab. Œdema...	...median
52	1920	889	25	P.	Albuminuria	In lab. Œdem... membranes rupt.	...median ...median
53	1920	975	25	P.	Albuminuria	Not in lab. Headac...	...median
54	1920	L.	21	P.	Eclampsia	Semi-conscious	...median
55	1913	M.B.	30	?	Eclampsia	Fits very numerous 1/- Membs. unrupt.	...silk, co... ...fusion
56	1915	S.O'H.	34	M.3	Eclampsia	Fits numerous b... counted. Urine scanty with alb. Membs. r...	...silk, con...
57	1910	420 J.M.	20	P.	C.P. C.V. 2½. Eclampsia	Os. = 2/-. Membs. r...	...silk, con...
58	1913	446 W.	18	P.	Eclampsia	Not in lab.	...silk, con...
59	1913	284 McC.	27	M.2	Eclampsia	Not in lab.	...silk, con...
60	1913	925 M.F.	19	P.	Eclampsia. C.P. C.V. 3¼+	Not in lab.	...silk, con...
61	1913	1047 M.	22	P.	Eclampsia	Not in lab.	...silk, con...
62	1915	356 McE.	21	P.	Eclampsia	Not in lab.	...ean hys...
63	1916	714 L.	26	P.	Eclampsia. Ovarian cyst	Comatose	...Int. silk... ...my and...
64	1914	1362 F.D.	34	P.	Eclampsia. Alb. + + Emergency	5 fits in 5 hrs. befo... Comatose. Venesecti... infusion. 2 more fits... op.	
65	1920	2375 A.P.	19	P.	Eclampsia. Alb. + + Emergency	Not in lab. 5 fits i... Unconscious. T. 102	...rd cont...
66	1916	I.M. 28 F.C.	25	—	Eclampsia	Not known	...eal
67	1916	M. 13044 H.H.	25	P.	Eclampsia	Comatose. P. 120 on...	...eal
68	1918	E.T.	29	M.6	Eclampsia	8th month. Not... Many fits. Much œde... alb. Op. on 3rd da... onset. Fits had ceas... patient was maniacal	...eal
69	1914	1097 G.B.	25	P.	Eclampsia. Alb. solid. Emergency	4 fits after adm. Not...	...W.G.
70	1915	1356 R.D.	39	M.5	Eclampsia. Ur. alb. blood. Emergency	Unconscious on adm... in lab. Fits before... Fits half-hourly afte... for 2 hrs.	...W.G.
71	1917	2222A F.S.	20	P.	Eclampsia. Alb. solid	Multiple fits on adm.	...W.G.
72	1918	2333 C.T.	26	M.3	Eclampsia. Alb. solid. Blood	8 fits before op. Not...	...W.G.
73	1920	2823 G.B.	29	M.1 Cæsar. 1914 Eclampsia	Albuminuria + +	No fits. In lab.	...W.G.

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
, med. and decapsulation of idney	D.	D	Peritonitis. Empyema left side. D. 8th day ? infection of left lung from injured kidney	—
median	G.	D.B.	—	Slight sapræmia 14–29th day
median	G.	G.	—	—
median	G.	D. 2 days	—	—
median	D.	G. G.	Peritonitis. D. 7th day	—
median	G.	G.	—	—
median	G.	G	—	Slight fever
median	G.	G.	—	—
median	G.	G.	—	—
median	G.	D. 11 hrs	—	T. 100° for 5 days. Alb. cleared up in a week.
silk, con. silk. O ii saline. fusion	D.	D.B. D.B.	D. 3rd day. P.M. No peritonitis; wound healthy. Fœtuses macerated	Maniacal after op. 3 fits 1st day
lk, con. silk. O ii saline	D.	G.	D. 3rd day. Suppression of urine. Uræmia	—
lk, con. C.G.	G.	D. 5 hrs		7 days pyrexia. Transfused before op. Unconscious on adm.
lk, con. C.G.	D.	G.	D. 12 hrs. later	—
lk, con. C.G.	G.	G.	—	Conscious on 2nd day
lk, con. C.G.	G.	D.B	—	6 days pyrexia. Bronchitis and pleurisy
lk, con. C.G.	D.	G.	D. 5th day. Resp. rose to 70	D. 5 days
an hysterectomy	D.	D.	D., eclampsia, 1st day	—
nt. silk, con. C.G. Ovario-my and appendicectomy	G.	D.	—	P.M., cong. of meninges. Internal hæmorrhage. Child died in 4 days
.	G.	D.B	—	Sl. febrile in 1st week
d cont. thr.	G.	G.	—	4 fits in 12 hrs. after op. Conscious in 3 days
al	D.	G.	D. in 24 hrs. from œdema of lung	—
al	D.	D.B.	D. some weeks after the op. from persistent diarrhœa	Sl. pyrexia
al	G.	G	—	Normal healing. Mania for some days. No fits after op.
W.G.	G.	G.	—	No fits after op.
W.G.	D.	D.B.	D. 24 hrs. after adm. Shock, etc., following op.	—
W.G.	G.	G G.	—	22 fits after op.; ceased after 36 hours. Fever for 3 weeks. Foul lochia
W.G.	G.	D.B.	—	No fits after op.
W.G.	G.	G.	—	Sl. alb. on discharge on 14th day

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient & of Operation, especially as regards Labour
74	1920	2834 E.S.	32	P.	Eclampsia. Alb. + +	2 fits before adm. unconscious. Not in
75	1920	2869 E.G.	35	P.	Eclampsia. Alb. solid	Patient unconscious. fits before adm., 1 aft in lab.
76	1920	3013 L. McD.	36	?	Eclampsia. Albuminuria	A few fits before 1 fit before op.
77	1920	3055 E.P.	40	M.4	Headache. Vomiting. Œdema of legs. Albuminuria. Delirium. Unconsciousness. No fits apparently.	Not in lab.
78	1920	3117 N.S.	28	M.4	Eclampsia. Alb. solid. Emergency	Semi-conscious on 1 fit in Hospital befor
79	1917	E.S.	25	P.	Eclampsia	3 fits before op.
80	1920	L.	23	P.	Eclampsia. Much alb.	consciousness betwee 8 months preg. F fits. Unconscious
81	1919	W.	26	P.	Chronic nephritis	36 weeks preg.
82	1918	R.M.	33	?	Albuminuria	Cloud of alb. in uri
83	1920	E.K.	40	?	Albuminuria	Severe œdema
84	1919	C.G.	22	?	Eclampsia	Albuminuria
85	1919	E.B.	35	?	Advanced nephritis	Albuminuria
86	1911	E.B.	25	P.	Eclampsia at 35th week of preg. 8 fits preceded op. Much alb. 24 hrs. between 1st fit and op.	Comatose. In lab in first stage. mem rupt. 3 or 4 exams.
87	1913	M.G.	27	P.	Eclampsia	Coma and pyrexia in lab.
88	1914	F.D.	38	P.	Eclampsia. Urine solid on boiling. 8 fits in 6 hrs.	Not in lab.
89	1916	S.H.	23	P.	Eclampsia at 37th week. Œdema and headache for 14 days. Much alb. 10 fits in 3 hrs which intervened between onset and op.	Not in lab.
90	1919	A.L.	23	P.	Eclampsia	Pains had started. rupt. Fœtal head we brim. One exam. p
91	1920	E. McC.	32	M.5	Albuminuria. Headaches; œdema; vomiting. B.P. 160, becoming more severe; Alb. 2 per 1,000, in spite of rest, diet, etc., for 5 weeks	At 32nd week. lab. Twins
92	1920	J.F.	26	P.	Eclamosia at 35th week. Had been treated for a month for albuminuria, œdema and epistaxis. On adm. had had 5 fits in 12 hrs; 2 more after adm. General œdema and *ascites*. B.P. 140. Alb. 10 per 1,000	—

Technique.	*Result.*		*If Patient Died, state cause of Death and time after Operation.*	*Remarks on Puerperium.*
	Mother.	*Child.*		
S.W.G.	G.	G.	—	Offensive lochia for 10 days
S.W.G.	D.	D.B.	Patient died in a fit 5 hrs. after op.	Multiple fits after op.
S.W.G.	G.	G.	—	Acute mania developed 3rd day after op. No fits
S.W.G.	D.	D.B.	D. 4 hrs. after op	—
S.W.G.	G.	G.	—	Had 4 fits during 1st 2 hrs. after op. Good recovery
median. Int. silk	G.	G.	—	—
median. Int. silk	D.	D.B.	Did not regain consciousness. D. in 12 hrs.	—
median. Int. silk. Spinal thesia	G.	G.	—	Rapid improvement
cal	G.	G.	—	—
cal	G.	G.	—	—
cal	G.	?	—	—
sical. Abscess of R. ovary l. Removal of R. Apps. and on of L. tube	G.	D. 6 days	—	—
al general technique. Conive C.S.	D.	D.B.	Chloroform before adm., to control fits. Pt. comatose before op., and died half-an-hour after. Op. was performed practically without any anæsthetic	—
rs C.G.	D.	G.	Pt. remained comatose. Almost complete urinary suppression. D. on 5th day. P.M. Op. area clean	—
rs C.G.	G.	G.	—	Rapid and complete recovery. Slight pyrexia for 5 days. No alb. on discharge. Normal labour in 1918
rs C.G.	G.	D.	Baby D. 6 weeks later	1 fit 10 hrs. after op. Severe pyrexia for 10 days. No alb. on discharge. Normal labour in 1918
rs C.G.	G.	D.	—	Pyrexia for 10 days
rs C.G.	G.	G. D.B.	—	Rapid recovery. No alb. on discharge
rs C.G.	G.	G.	—	Prolonged wound sepsis for 5 weeks. No alb. on discharge 7 weeks after op.

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient & of Operation, especially as regards Labour.
93	1920	E.H.	25	P.	Hyperemesis. Vomiting severe from beginning of preg. At 18th week vomiting ceased under treatment in Hospital, but recurred and had persisted. On readmission in 36th week emesis was uncontrolled by any treatment and pulse persisted between 130—140. Urine : Ammonia ratio 11.7%, diacetic Ac., urobilin, alb. a trace	—
94	1912	M.M.	33	P.	Eclampsia. Alb. almost solid. Emergency	Not in lab. 36th 4 fits before op. between 1st fit and
95	1913	F.H.	18	P.	Eclampsia	Not in lab. 4 fits op. Op. 5 hrs. after 38th week
96	1914	H.F.	36	P.	Eclampsia. Urine solid. Emergency. B.P. 165 mm.	Not in lab. 8 fits op. 2 hrs. from 1st fi
97	1914	N.Q.	26	P.	Eclampsia. Emergency. Alb. almost solid	20 fits before op.
98	1914	B.M.	28	P.	Eclampsia. Urine solid. Emergency. Complete anuria. Jaundice	Not in lab. Coma adm. 7 fits before o 7 hrs. after 1st fit. just before op. P. 14
99	1914	E.B.	20	P.	Eclampsia. Urine solid. Emergency	Not in lab. Coma fits before op. Op. after first fit. Twins
100	1915	F.C.	29	P	Eclampsia. Emergency. 0.6 per cent. alb.	Comatose on adm. before op., 6 hrs after
101	1915	E.L.	23	P.	Eclampsia. Emergency. 1 per cent. alb.	In lab, 1st stage. before op., 5 hrs. after
102	1916	E.C.	26	P.	Eclampsia, mild type	1st fit 16th Oct. 0 Oct. 5 fits, not roughly one every 2 Not in lab.
103	1916	M.D.	25	P.	Eclampsia. Emergency. Alb. solid	1 fit before adm.; fits before op. Not 5 hrs. between 1st fit
104	1919	M.G.	21	P.	Eclampsia. Emergency. Comatose	Not in lab. 12 fits adm., 2 fits after ad fit to op. was 6 h note of urine at time
105	1919	S.J.	30	P.	Eclampsia. Emergency	3 fits before op. Op after 1st fit
106	1920	46144 K.C.	21	P.	Eclampsia. Alb. two-thirds, boiling	7 months preg. 2 fit before op.
107	1920	40054 G.A.	26	P	Eclampsia 2 days after adm. for albuminuria. Alb. two-thirds, boiling	36 weeks preg. De eclampsia in spite of treatment. 2 fits imm before op. Only before adm., slight 1 week. B.P. 160

Technique.	Result. Mother.	Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
yers C.G. Stovaine, lumbar esia	G.	D.	Baby D. in 24 hrs. Ill-nourished. 4 lbs.	Rapid recovery. *Uterus bicornuis bicollis.* This caused marked asymmetry of the gravid uterus with a tumour to the right side. A suggestion of intestinal obstruction was raised and this was an additional indication for laparotomy. At op. the preg. was found in the R. horn
ilk, cont. silk	G.	G.	—	No fits after op. Prolonged low pyrexia. Vomiting, diarrhœa, distension. Faint trace alb. on discharge
rs C.G.	D.	G.	D. 9th day after op. from general peritonitis. P.M. secondary suppurative pericarditis	1 fit 6 hrs. after op.
rs C.G.	G.	G.	—	No fits after op. Sl. rise of T. 5th to 8th day. Trace alb. on discharge
rs C.G	G.	D.B.	—	3 fits after op. Ceased 6 hrs. after op. Developed broncho-pneumonia at once. Pyrexia 19 days. Faint trace alb. on discharge
rs C.G.	D.	D. 7 hrs	Mother D. on 6th day. Very drowsy for 4 days. Distension. Vomiting	—
rs C.G.	D.	D. D.	P.M. Kidneys, tubular nephritis; liver, areas of necrosis. D. 6 hrs. after op.	—
rs C.G.	G.	D.B.	—	Practically normal. Very slight pyrexia 1st 10 days. No alb. on discharge. No fits after op.
rs C.G.	D.	D.	D. comatose, apparently of heart failure	8 fits after op. Hæmorrhage and focal necrosis liver and kidneys
rs C.G.	G.	G.	—	Normal recovery. Faint trace of alb. on discharge
rs C.G.	G.	G.	—	No fits after op. Faint trace of alb. on discharge. Rapid recovery
rs C.G.	G.	G.	—	7 fits after op., last one 11 hrs. after op. No alb. on discharge.
ilk	G.	G	—	3 fits after op., the last 18 hrs. after. Pyrexia due to breast-abscess. Much alb. on discharge
—	D.	G	D. pulmonary embolism 10 days after op.	No fits after op. At first did very well.
S.W.G.	G.	G.	—	Afebrile. Trace of alb. on discharge. No fits after op.

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient o of Operation, especia regards Labour.	Tech
108	1920	41212 M.W.	26	M.2	Eclampsia. Alb. two-thirds	26 weeks. Fit 2 ho adm. Blindness just onset of fit	nal Cæs.
109	1920	42530 F.L.	44	M.6	Eclampsia. Emergency. Alb. solid	7 months preg. S onset of fits on day o 7 fits between 6-30 a.m 11 p.m. Op. Not in	S.W.G.
110	1920	43322 M.B.	32	M.2	Eclampsia. Emergency	38 weeks. Quite w day of adm. Headac of vision 5 a.m. day o 1st fit 10 a.m. 7 fo fits. Not conscious b fits	silk
111	1920	43222 L.R.	40	P.	Eclampsia. Alb. four-fifths, boiling	38 weeks. 1 fit before adm. ? 4-5 fits before adm. 4 days adm. suddenly became cal. Op. followed	S.W.G.
112	1920	46488 F.D.	28	P.	Eclampsia. Alb. half, boiling	24 weeks preg. A med. ward as albumi 1 fit in med. ward. lab. B.P. 158 at 1st fits during night befo	nal Cæs
113	1920	45770 G.C.	29	P	Eclampsia Emergency. Alb. two-thirds	7 months preg. Œ ankles 3 weeks. Adm eclamptic fit. At lea before op.	silk
114	1920	45652 C.F.	32	P.	Eclampsia. Alb. three-quarters	8 months preg. A albuminuria. Fit 2 da adm. Urine solid. followed fit	S.W.G.
115	1919	44139 M.W.	25	P	Eclampsia	30 weeks preg. 18 fit op. 1st fit 15 hrs. bef Comatose since 1st 105.6°, P. 160	nal Cæs
116	1919	43555 F.A.	20	P	Eclampsia. Alb. solid	Unconscious on adm in lab. Another fit op. Emergency. Pr coma after op.	silk
117	1918	40939 G.B.	21	?	Eclampsia. Alb. solid	*In extremis* on adm sec. immediately afte Constant fits. Comat	silk
118	1917	40635 M.F.	20	P.	Eclampsia. Alb. solid	14 days from term. before adm. 1st fit before adm. 3 fit adm., before op.	silk. thesia
119	1917	40741 F.T.	24	P.	Eclampsia. Alb. solid	14 days from term before adm. 1st fi before op.	silk
120	1918	44104 A.M.	24	?	Eclampsia. Alb. cloud	3 fits with great œde	?

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
al Cæs. sect	G.	D.B.	—	Faint haze of alb. on discharge. No note of fits after op.
S.W.G.	G	G.	—	1 fit after op. Became maniacal for 4 days. Persistent drowsiness. Alb. present on discharge
ilk	G.	G.	—	No fits after op. Alb. not noted
S.W.G.	D.	G.	D. 12 days after op. from pneumonia. No. P.M.	No fits after op.
al Cæs. Sect.	G.	D.B.	—	T. 100.6° 3 days after op., otherwise afebrile. No fits after op. No alb. on discharge
ilk	G.	G.	—	Afebrile. Fits continued after op. No alb. 20 days after op.
S.W.G.	G.	G.	—	T. 100.2° for 3 days. 2 fits after op. Trace alb. 12 days after
al Cæs. Sect.	D.	D.B.	D. 10 hrs. after op. P.M. Multiple hæmorrhagic necrosis (up to 3×2 cm.) throughout liver. Fatty degeneration of kidneys. Œdema of lungs. Severe parenchymatous degeneration of myocardium. Slight general anarsarca	1 fit immediately after op
ilk	G.	G.	—	7 fits after op. at hourly intervals (approx.); 3 fits following day; 2 fits 2nd day; 8 fits 3rd day. Patient regained consciousness towards end of 4th day. Prolonged nystagmus after op. Toxæmic rash 2nd day after op. T. 101.5° 1st day, 100.5° to 6th, otherwise afebrile. Prolonged convalescence
ilk	D.	G.	D. day after op. No. P.M. Acute toxæmia	Fits continued after op. Remained comatose
silk. Stovaine spinal esia	G.	G.	—	T. 103° day after op.; gradually settled, and rose again to 103° 15th day for 1 week, due to parametritis. No fits after op.
ilk	G.	G.	—	T. 102° 2nd day after op. Gradually subsided. 3 fits after op.
!	G.	G.	—	—

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at Operation, especially as regards Labour.	Tech
121	1916	42817 S.H.	20	P.	Eclampsia. Alb. solid	7½ months preg. N lab. Not conscious b fits. Op. 12 hrs. afte	?
122	1916	42844 A.F.	44	M.7	Eclampsia. Alb. three-quarters	8 months preg. Not Op. 10 hrs. after ons	?
123	1916	44183 E.R.	29	I	Eclampsia. Alb. one-half	36 weeks preg. E general œdema. 3 fits after adm. Urine Immediate op.	silk
124	1916	43243 V.W.	19	P.	Eclampsia. Alb. one-third	Not in lab. 1 week term. 7 fits in the before op.	silk
125	1914	43229 M.S.	32	M.2	Eclampsia	2 fits before adm. before op. Early in	C.G.
126	1914	42669 A.L.	36	P.	Eclampsia	30 weeks preg. Ad unconscious. Gross Several fits 12 hrs. adm. 1 fit after adm. op.	C.G.
127	1914	42248 M.L.	19	P	Eclampsia	5 fits before adm. hourly; after adm. hourly for 6 hrs., then section. 1 fit 1½ hrs Several pints of free peritoneal cavity at	C.G.
128	1914	42379 H.J.	30	P.	Eclampsia	7 months preg. Ad unconscious. 2 fits bef	?
129	1913	43268 E.B.	20	P.	Albuminuria of Preg	8 months preg. N lab. Conservative tre for 5 days. Pre-ecl state suddenly deve Cæs. sec.	sical
130	1911	2112 A.G.	31	P	Eclampsia	Full time. In lab. 1/-. 1st fit 10 hrs. op. Severe symptoms 15 hrs. before op. 1 month. Death duri P.M., Cæs. sec.	Cæs.
131	1914	D.D.	30	M.2	Eclampsia. Emergency	Not in lab. 8 month Urine solid. Alb. 1 Jan. 11th, from then 18th was quite well. had a series of fits	sical. S
132	1914	C.L.	28	P.	Eclampsia	Not in lab. 7 month Fits before adm. 2 fi adm. Semi-conscious	sical. C
133	1915	E.L.	22	P.	Eclampsia	Not in lab. Œdema 6 weeks, headache 4 6 fits before op.	sical. C
134	1915	F.T.	35	M.2	Eclampsia	Not in lab. 37 week Œdema one month. scious, deeply cyanosed before op.	sical. I
135	1916	A.H.	20	P.	Eclampsia. Emergency	20 fits before op.; after. Os=2/-. rupt.	sical. I
136	1916	G.R.	21	P.	Eclampsia. Emergency	No notes	notes
137	1916	R.F.	36	M.7	Eclampsia. Emergency	No notes	sical
138	1917	E.H.	38	P.	Eclampsia	8 fits before op. Not Unconscious. 26 wee	sical.

Technique.	Result. Mother.	Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
?	G.	D.B.	—	T. to 101° 4 days after op., otherwise afebrile. 2 fits after op.
?	D	G.	D. 5 days after op. No P.M. Broncho-pneumonia	Post-operative broncho-pneumonia
silk	G.	G.	—	9 fits after op. at intervals of 1–2 hrs. Conscious between fits. Stuperose till 2 days after o. Afebrile. Alb. trace on discharge
silk	G.	G	—	T. 101° for 1 day, otherwise afebrile. No fits after op.
C.G.	G.	G.	—	T. 100° 2nd, 4th, 5th and 6th days, otherwise afebrile. 4 fits after op.
C.G.	G.	D.B.	—	T. to 100.2° days after op. Occasional to 100° for 10 days. Alb. one-twelfth (boiling) after op. and on discharge
C.G.	G.	D.B.	—	T. 103° day after op. Gradually settled. No fits after op.
?	D.	D.	D. from toxæmia of preg. and heart-failure	D. few hrs. after op
sical	D.	G.	D. 40 hrs. after op. General sero-purulent peritonitis and usual kidney and liver changes of eclampsia	2 fits after op.
Cæs. sect.	D.	D.B.	D. just before op.	—
sical. Silk	G.	D.	—	No fit after op. Child D. 16 days old; birth wt. 4 lbs.
sical. C.G.	G.	D.B.	—	—
sical. C.G.	G.	G.	—	—
sical. Int. silk	G.	G.	—	No fits after op.
sical. Int. silk	G.	G.	—	No fits after op.
notes	D.	D.B.	Mother D. 4th day	—
sical	D.	?	Pt. D. on same day as op.	Infant born alive. No further note
sical. Int. silk	G.	D.B.	—	No fits after op.

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at of Operation, especial regards Labour.	Techn
139	1917	L.B	26	P.	Eclampsia. Emergency	3 fits before op. œdema of vulva. 34 weeks preg.	sical
140	1918	E.W.	22	P.	Eclampsia. Emergency	6 fits before op. lab. Alb. solid.	sical
141	1920	A.K.	34	P.	Eclampsia. Emergency	Not in lab. 11 fits op.	sical
142	1920	R.W.	26	P.	Eclampsia	Not in lab. Urine with alb. Twins. œdema. 2 fits before	sical
143	1914	490 G.S.	26	P.	Eclampsia. Alb. solid. Emergency	Full term. Unconsci adm. Not in lab. Ma before op.	ers int.
144	1916	1281 E.H.	34	P.	Albuminuria. Alb. solid. Toxæmic symptoms	8 months preg. Prem membs.	ers int.
145	1917	1713 M.S.	26	P.	Eclampsia. Aortic regurgitation. Double mitral disease. 1 fit on adm. Urine solid with alb.	Not in lab. Con Venesection and saline sion during op.	ers int. s
146	1918	67 E.B.	36	P.	Albuminuria. Twins. Urine loaded with alb.	Not in lab. 8 mos. Œdema	silk
147	1920	626 L.R.	22	P.	Chronic nephritis. Urine solid alb. Tremendous œdema of vulva and lower limb	Not in lab. 8½ mos. P	silk
148	1918	M.C.	40	P.	Albuminuria	In lab. Transv. prese	ers C.G.
149	1912	K.S	33	P.	Eclampsia. Urine loaded with alb. Emergency	6½ months preg. Ha unconscious following Had 4 fits previous to Not in lab.	silk. C
150	1912	C.D.	42	M.?	Eclampsia. Urine solid with alb., some blood. 5 fits before adm. Emergency	7 months preg. In Os=1/-. Membs. not Unconscious. 5 fits adm.	silk. C
151	1920	J.S.	31	M.1	Eclampsia. Urine loaded with alb. and blood-stained. Unconscious. Emergency. 15 fits before op.	37 weeks preg. Not Unconscious	silk. C
152	1912	590 A.J.	43	P.	Eclampsia. Alb. solid. Emergency	Unconscious. 3 fits op. 7½ hrs. between op.	S.W.G.
153	1914	549 G.C.	26	P.	Eclampsia. Heavy cloud alb. Emergency	Semi-conscious. 4 fits op.; 1st fit 6 hrs. befo	thr.
154	1915	434 E.E.	21	P.	Eclampsia. Loaded with alb.	Unconscious. 6 fits, before op.	S.W.G.
155	1917	779 L.	34	P.	Eclampsia	32 weeks. 14 fits, 6 before op.	S.W.G.
156	1918	801 W.	31	P.	Eclampsia	38 weeks. Comatose. 6 hrs. before op. 1 fit op.	S.W.G.
157	1920	56 E.M.	41	M.3	Eclampsia. Alb., a trace	Admitted for slight A 4 days later, 3 fits op. 10 hrs. between and op.	S.W.G.

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
sical	G.	D. 8 days	—	No fits after op.
		G.		
sical	G.	G.	—	21 fits after op.
sical	G.	D. 10 days	—	No fits after op.
ical	G.	G.	—	No fits after op.
		G.		
ers int. silk	G.	G.	—	Prolonged unconsciousness after op. Generalised twitching every few minutes day after op., 3 days after op. quite conscious. Urine free from alb. on 12th day
ers int. silk	G.	?	—	T. 101° 3 occasions, but normal on 9th day. Good recovery
ers int. silk. Spinal anæsth.	G.	D	—	T. 101° on 4th day. Wound burst open on 6th day; resutured under anæsthetic. Urine clear of albumin on 27th day
silk	G.	G.	—	Urine clear of alb. on 19th day. T. 100-101° from 2nd to 8th day, then normal
		G.		
silk	G.	G.	—	Afebrile convalescence. On discharge 25th day still a trace of alb. in urine
ers C.G.	G.	D.B.	—	Fœtus macerated
silk. Cont. C.G.	G.	D.B.	—	No fits after op., but patient very drowsy. Medical treatment strongly pushed. No alb. in urine on 17th day after op.
silk. Cont. C.G.	G.	G.	—	Had 3 fits after op. Medical treatment pushed. Consciousness returned day after op.
silk. Cont. C.G.	D.	D.B.	—	2 fits after op. Consciousness not regained. Sudden final collapse
S.W.G. Cont. thr. and C.G.	D.	G.	D. 8½ hrs. after op.	No fits after op. Comatose till D.
thr.	G.	G.	—	1 fit after op. Conscious in 12 hrs. Steady improvement. Alb. much less
S.W.G.	D.	G.	—	3 fits after op.
S.W.G.	D.	D.B.	D. in 4 days	—
S.W.G.	D.	D.B.	D. in 24 hours. Anuria continued	No fits after op.
S.W.G. Cont. C.G.	G.	G.	—	Uneventful. No alb. on discharge

No	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at of Operation, especial regards Labour.	Techn
158	1920	165 E.P.	34	M.4	Eclampsia. Alb. 0.2 per cent.	2 fits. 2 hrs. betwee fit and op.	S.W.G. a
159	1920	177 E.B.	29	P.	Eclampsia. Alb. loaded	4 fits before op. 3 between 1st fit and op.	t. S.W.G val of an
160	1920	233 A.B.	27	P	Albuminuria	38 weeks preg. Alb per cent. Dimness of v Sudden onset 7 days b adm.	S.W.G. a
161	1920	45 M.A.	28	—	Eclampsia. Alb. 0.1 per cent.	Op. 19 hrs. after 1 Fits, Jacksonian in starting in right hand. fits. Unconscious. 34 preg.	S.W.G. a
162	1916	L.H.	24	P.	Eclampsia. Alb. present	Semi-comatose. Sever before op.	sical
163	1919	F.K.	32	P.	Eclampsia. Much alb.	Semi-comatose. 4 fits op.	sical
164	1919	R.S.	42	M.1	Eclampsia	5½ months preg. B.P Cloud of alb. Semi-con	assical. E id
165	1914	301 B.	22	P.	Eclampsia	Comatose. Had 20 f preceding 9 hrs. Not i	vers C.G.
166	1914	421 McK.	31	P.	Eclampsia	Comatose. Fits for Not in lab.	vers C.G.
167	1917	347 M.	26	P.	Eclampsia and contracted pelvis	Lab. 12 hrs.	vers C.G.
168	1920	70 McD.	24	P.	Eclampsia	Comatose. Twins. Not i	vers C.G.
169	1919	P.McC.	35	P.	Albuminuria of preg.	8 mos. preg. Great o of legs and vulva. Alb per cent. Little respons	silk
170	1918	K.F.	26	P	Albuminuria of preg.	In lab. Os=2/-. M not rupt. Much alb.	silk
171	1918	B.	22	P.	Albuminuria of preg.	In lab. 12 hrs. M rupt. T. 102°. Os Much œdema. Alb. quarters	silk
172	1917	M.M.	25	P.	Albuminuria of preg.	Not in lab. 8 months Alb. 1.4 per cent. œdema. 2 days treat slight improvement, vomiting persistent	silk
173	1916	J.M.	22	P.	Eclampsia	Had eclampsia succes treated, but the renal i ciency was too great to pregnancy to continue. 5 days after fits.	silk
174	1918	M.D.	29	P.	Eclampsia. Some A.P.H.	Not in lab. 13 fits found toxæmia	silk
175	1920	E.R.	35	M.6	Hyperemesis and toxæmia	Not in lab. 34 weeks Vomiting for 6 wks. T	silk
176	1919	E.B.	38	P.	Eclampsia	17 days from term. before adm. Bronchitic Conscious. Œdema of P. 120. Urine loaded alb. Os closed.	sical

Technique.	Remarks on Puerperium.		Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.
S.W.G. and C.G	G.	G.	—		No fits after op. No alb. on discharge
t. S.W.G. Cæs. Sect. and val of an ovarian cyst	G.	D. 4 days	—		No alb. on discharge
S.W.G. and C.G.	G.	G.	—		Paracentesis abdominis twice for ascites. Febrile, 100—101 for 14 days. Trace alb. on discharge
S.W.G. and C.G.	D.	G.	—		Pt. maniacal and fits continued for 3 days. After recovery from anæsthetic right-sided flaccid paralysis noted. Death due probably to cerebral hæmorrhage or thrombosis
ical	G.	G.	—		Uninterrupted recovery. No fits after op.
ical	G.	G.			No fits after op. Good recovery
ssical. Enucleation of small id	G.	D.B.	—		No fits after op.
ers C.G.	G.	D.B.	—		—
ers C.G.	D.	D.B.	D. on 3rd day, after brief improvement		—
ers C.G.	G.	G.	—		—
ers C.G.	D.	D.D.	D. on 2nd day		—
silk	G.	G.	—		Afebrile. Trace of alb. until discharge
silk	G.	G.	—		Afebrile. Alb. disappeared in 2 days
silk	G.	D.B.	—		For 3 weeks T. 101°–103°. Localized peritonitis and sepsis of abdominal wall. 2nd operation to drain through post. fornix. Good recovery. Fœtus macerated
silk	D.	G.	—		Eclamptic fit 7 hrs. after op., followed by 3 more, and died 12 hrs. after delivery. Treatment, intravenous saline, chloral, bromide, morphia, repeated twice; as struggling was violent, chloroform
silk	G.	G.	—		Uneventful renal condition cleared early
silk	D.	D.B.	D. 10 mins. after delivery of child. Liver very disorganised and in kidneys marked blood extravasation		Fœtus macerated
silk	D.	D.B. D.B.	D. of lobar pneumonia on 2nd day. Toxæmia improved		Fœtuses macerated
sical	D.	G.	Patient did not rally from toxic condition. Two fits after op. D. 3rd day with high T. and chest complications		—

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at Operation, especially as regards Labour.	Technique
177	1920	R.B.	27	?	Eclampsia	Unconscious on adm. ical 12 fits in 8 hrs. preceding	
178	1913	S.S.	28	P.	Eclampsia	7 mos. preg. 6 fits ical ½ gr. morphia hypod. o 9 hrs. before op. Con Good condition. Not Urine loaded with alb	
179	1914	A.M.	27	M	Eclampsia	Full term. In lab. ical Fits preceded onset of some hrs. Urine loade alb., and patient œdem 11 fits before and 1 adm. Unconscious fo	
180	1917	E.H.	30	P.	Eclampsia	Fits outside, 2 after ical Urine loaded with alb conscious. 1st stage Pulse very feeble. Tw	
181	1917	E.S.	30	P.	Eclampsia	Ill day before adm. ers C.G Unconscious, bloated, re Os admits 1 finger. preg. Urine loaded wi No fits for 9 hrs. after but complete suppress urine. Op. 24 hrs. afte	
182	1920	M.M.	30	?	Eclampsia	Several fits before ers C.G Comatose. Œdematous osed. 8 fits in rapid sion. Urine loaded wi and blood. Os slightly d Op. 24 hrs. after fits Medical treat. not succ	
183	1919	A.L.	25	P.	Eclampsia	Known to have been t ers C.G for albuminuria prior t fits began evening befo of adm. Os=2/6 for s days. No lab. "pains conscious. P. 130, R.	
184	1918	H.A.	29	?	Eclampsia	6 fits before adm., t ers C.G then general convu Urine loaded with alb	
185	1913	369 E.G.	27	P.	Eclampsia	1st stage lab. Twins Not in lab. 10 fits ers C.G.	
186	1914	30 F.C.	22	P.	Eclampsia	op. Alb. solid Not in lab. 12 fits ers C.G.	
187	1914	1307 E.B.	35	M.4	Eclampsia	op. Alb. solid	
188	1916	477 E.C.	23	P.	Eclampsia	2 fits before op. Trac ers C.G. 5 fits before op. Alb ers C.G	
189	1918	55 R.W.	21	P.	Eclampsia	Twins Not in lab. 7 month ers C.G.	
190	1919	1089 F.R.	31	P.	Eclampsia	Alb. solid Not in lab. 8½ m ers C.G.	
191	1919	1581 S.B.	35	P.	Eclampsia	preg. 3 fits Not in lab. 8 month ers C.G.	
192	1919	1655 A.W.	28	P.	Eclampsia	18 fits before op. In lab. 8½ months ers C.G.	
193	1920	112 G.B.	29	P.	Eclampsia	13 fits before op. Not in lab. 7 month ers C.G.	
194	1920	13 H.B.	29	P.	Eclampsia	20 fits before op. In lab. 8½ months ers C.G.	
						18 fits before op.	

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
ical	G.	D.B.	—	Meconium in amniotic cav. Child gasped feebly. Pt. regained consciousness 2 days after op. No more fits. Severe pulmonary symptoms, but was discharged 26th day
ical	G.	D.B.	—	No more fits. Convalescence v.g. Slight temp., maximum 99.8°. Discharged well 14th day.
ical	D	G.	—	3 fits during night following op. No response to purgatives and enema. D. 3rd day. Never rallied from toxæmia.
ical	D.	D.B. D.B.	—	D. at end of op. Extreme toxæmia
ers C.G	G.	D. few hrs	—	Puerperal insanity. T. three times over 100°F., otherwise good till discharge to asylum on 21st day. Then rapid mental recovery
ers C.G	D.	D.B.	D. soon after op. Severe toxæmia	Fœtus not viable
ers C.G	D.	D.	D. 2nd day. Toxæmia	—
ers C.G.	D.	D.B. D.B.	Pneumonia. D. 7th day	No more fits, but continued very ill, with mental disturbance
ers C.G.	D.	D.B.	D. in 2 days	4 fits after op. Hyperpyrexia
ers C.G.	D.	D.	D. in 1 day	Hyperpyrexia. No more fits
ers C.G.	G.	G.	—	Afebrile
ers C.G	D.	D.B. D.B.	D. next day	Continuous fits. Hyperpyrexia
ers C.G.	D.	D.B.	D. same day. Comatose	—
ers C.G.	G.	G.	—	Afebrile
ers C.G.	G.	D.B.	—	Afebrile
ers C.G.	G.	D.B.	—	Afebrile
ers C.G.	G.	D.B.	—	Afebrile
ers C.G.	D.	D.B.	D. 3rd day. Comatose	—

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at of Operation, especial regards Labour.	Techn
195	1920	149 M.C.	27	P.	Eclampsia	Not in lab. 16 fits bef	rs C.G.
196	1920	184 M.M.	34	M.2	Eclampsia	In lab. 6 months 14 fits before op.	rs C.G.
197	1920	239 E.C.	27	P.	Eclampsia	Not in lab. 12 fits bef	rs C.G.
198	1914	367 I.A.R.	41	M.3 Eclampsia with all	Eclampsia	7 months preg.	
199	1920	797 E.J.W.	24	M.1	Eclampsia	17 fits before op.; th 2 days before adm. alb. 11.0 grm. per litre	
200	1920	354 A.B.	23	P.	Albuminuria. General œdema	In lab. 6 hrs.	
201	1919	81 E.L.	39	P.	Eclampsia		ilk
202	1917	44/119 A.McP.	20	P.	Eclampsia. Contracted pelvis	On adm., 9 days bef urine=no alb. Day op. headache. During preceding op. had 10 f admits 2 fingers. Membr	?
203	1914	115 B.F.	19	P.	Eclampsia. Alb. solid. 15 fits. Contracted pelvis	Lab. began 5 days adm. Urine still large tity of alb. No fit this time	G. and
204	1915	268 B.V.	34	P.	Eclampsia. Alb. solid. 15 fits	In lab. ? P.V. ? 9 hrs. before op.	hr. and
205	1918	16 A.R.	21	P.	Eclampsia. Alb. solid. Many fits	Not in lab. 2 P.V. Time between 1st fi op. ? but at any rate than 8 hrs.	hr. and
206	1918	471 L.H.	29	P.	Eclampsia. Alb. solid	Not in lab. Twins before op. 1st fit before op.	G. and
207	1919	239 D.B.	29	P.	Eclampsia. Alb. solid. Many fits before adm., 4 after adm.	In lab., term. T. 103 op. P. 112	hr. and
208	1919	341 F.L.	39	M.9	Pre-eclamptic toxæmia. No fit. Attacks of blindness and breathlessness, headache, scanty urine. Alb. solid	Not in lab. 38 weeks Twins	hr. and
209	1919	393 R.W.	28	M.2	Albuminuria and other symptoms of toxæmia, also present with last preg., though alb. disappeared before patient went home	Not in lab. 39 weeks	hr. and
210	1919	442 M.B.	27	P.	Eclampsia and contracted pelvis. Alb. solid. No fit before adm.	2 fits after adm. 30 mins. before op.	G. and
211	1919	450 S.N.	23	P.	Eclampsia. Alb. solid. 10 fits before op.	1st fit 6 hrs. befor In lab. 7½ months pr	G. and
212	1919	493 S.B.	41	M.11	Albuminuria and toxæmia. Dizziness, blindness, headache and dyspnœa	Not in lab. Term	G. and
213	1919	524 A.A.	33	M.2. 1, 8 mths D.B.; 2, albuminuria; alive term, 1908; had eclampsia 5½ mths, 1915	Eclampsia. Alb. solid, 2 fits before op.	1st fit 2 hrs befor In lab. Term	hr. and

Technique.	Result. Mother.	Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
C.G.	D.	G.	D. same day. Hyperpyrexia	—
C.G.	D.	D.B.	D. same day, during a fit	—
C.G.	D.	D.	D. same day. Hyperpyrexia	—
—	D.	D.B.	D. next day	—
—	G.	G.	—	fits after op. Semi-conscious for a few days, but soon recovered. Trace of alb. on discharge
—	G.	G.	—	Satisfactory
	D.	G.	D. 5 hrs. after op.	—
?	G.	G.	—	Uneventful. Alb. 0.2 per cent. 12 days after op.
C.G. and cont. C.G.	G.	G.	—	No fits after op. General peritonitis on 8th day after op. due to leaking abscess in utero-vesical pouch. Drained from above and from P. of D. also. Left hospital well
ar. and cont. C.G.	G.	D.B.	—	P. 110–120 for 14 days. T. 99°–100° for 10 days. No fit noted after op. Alb. ? absent on discharge
r. and cont. C.G.	D.	G.	D. on 5th day of "heart-failure"	Conscious 24 hrs. after op. P. 130. No fits after op. Resp. rapid, T. 102°–103°
G. and cont. C.G.	G.	D.B.	Never regained consciousness and D. on 3rd day	No fits after op. 1st twin alive D. Alb. cleared before discharge
r. and cont. C.G.	D.	D.B.	—	1 fit after op. Passed urine freely after op.; less alb. T. 104°. P. 128–150
r. and cont. C.G.	G.	G.	—	2nd twin D. on 7th day. Good puerperium
		D.		
r. and cont. C.G.	G.	G.	—	Normal puerperium. Alb. cleared before discharge
G. and cont. C.G.	G.	G.	—	No fit followed op. Urine free from alb. on 9th day. T. and P. normal
G. and cont. C.G.	D.	D.	D. 11 hrs. after op	Child lived 36 hrs. Pt. never regained consciousness. T. 101°. P. 160
G. and cont. C.G.	G.	G.	—	Œdema o flegs gradually cleared, and alb. disappeared in a few days. T. and P. normal.
r. and cont. C.G.	G.	D.B.	—	Alb. cleared on 8th day. No fit after op. Normal puerperium

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at Time of Operation, especially as regards Labour.	Technique
214	1919	652 C.G.	38	P.	Eclampsia. Alb. much but not solid, and 6 fits before op. Contracted pelvis	1st fit 6 hrs. before op.	C.G. and
215	1919	653 J.E.	25	P.	Eclampsia. Alb. solid. Numerous fits before adm.	1st fit 5 hrs. before lab. Term	C.G. and
216	1920	37 A.C.	22	P.	Eclampsia. Alb. solid. 6 fits before adm.; none after	1st fit 6½ hrs. be In lab. 36 weeks p	hr. and
217	1920	265 E.G.	21	P.	Eclampsia. Alb. solid. 2 fits before adm.; none after	1st fit 5½ hrs. be In lab. Term	C.G. and
218	1920	350 E.G.	24	P.	Eclampsia. Alb. solid. 10 fits before adm.; 15 fits after adm.	1st fit 8 hrs be 25 fits before op. Term	C.G. and
219	1920	620 E.G.	—	P.	Eclampsia. Alb. solid. Many fits before adm. Constant twitchings after	1st fit 5¼ hrs. be In lab. 38 weeks	hr. and
220	1920	642 L.J.	22	P.	Eclampsia. Alb. solid. 12 fits before adm., 4 after.	1st fit 9 hrs. before op	hr. and
221	1912	H.P.	35		Eclampsia	Fits for 10 hrs. b Not in lab. Urine with alb.	al Cæs.
222	1912	E.S.	31	M.3	Eclampsia	5 months preg. 6 hrs. before op. N Urine loaded with	al Cæs.
223	1914	F.H.	25	P.	Eclampsia	No notes.	ical
224	1913	F.S.	18	P.	Eclampsia	Comatose on adm. P. 156/min. large of alb. Not in lab.	ical
225	1915	P.F.	29	M.1	Eclampsia	7 months preg. during 18 hrs. prec	ical
226	1915	A.W.	18	P.	Eclampsia	7 months preg. 7 f 2 days before adm.	ical
227	1916	R.M.	39	P.	Eclampsia	2 fits before op. N	ical
228	1916	M.C.	29	P.	Eclampsia	2 fits before op. N	ical
229	1916	E.S.	22	P.	Eclampsia.	6½ months preg before adm. Not	ical
230	1916	E.S.	25	P.	Eclampsia.	6½ months preg. before adm. Coma solid	ical
231	1916	M.T.	44	P.	Eclampsia	6½ months preg.	ical

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
C.G. and cont. C.G.	G.	G.	—	No alb. 2 days after op. Conscious 12 hrs. after op. Puerperium good. No fits after op.
C.G. and cont. C.G.	G.	G.	—	Conscious on 3rd day. No fits after op. On 10th day alb. had gone from urine. P. rapid for 5 days to 132. T. normal constantly
thr. and cont. C.G.	G.	G.	—	Pt. conscious next morning. On 10th day alb. disappeared. P. 100 for 3 days. No fits after op.
C.G. and cont. C.G.	G.	G.	—	Few short fits after op. None after 6 hrs. Trace of alb. on leaving hosp. P. and T. normal after 36 hrs.
C.G. and cont. C.G.	D.	D.B.	Pt. never regained consciousness and D. within 10 hrs.	2 fits after op. T. and P. raised and gradually got worse. Œdema of lungs
thr. and cont. C.G.	D.	D. 5 hrs	Pt. D. with hyperpyrexia. T. 108°, P. 160, 28 hrs. later	1 fit and almost continuous twitching till 12 hrs. after op., then deeply comatose
thr. and cont. C.G.	G.	G.	—	No fit after op. No alb. in urine on discharge
al Cæs. sect.	G.	D.B.	—	More or less comatose for 3 days after op. Sent to asylum after 3 weeks on account of mental state
al Cæs. sect.	G.	D.B.	—	4 fits after op., the last 6 hrs. after
ical	G.	G.	—	No notes; but had high T. for 4 weeks after delivery
ical	G.	?	—	7 fits after op. At the end of week alb. 0.15 per cent.
ical	G.	D.B.	—	No fits after op. 5 days after, "still a moderate amount of alb."
ical	G.	D.B.	—	No notes
ical	G.	D.B.	—	1 fit after op.
ical	G.	G.	—	No. alb. 18 days later
ical	G.	D.B.	—	Normal. 1 fit after op.
ical	G.	D.B.	—	?
ical	G.	D.B.	—	?

Table XV.—PLACE EVIA

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient of Operation, especi regards Labour	Techn
12	1915	721 L.W.	31	P.	Central plac. præv.	In lab. 26 hrs. Condit	rs C.G.
18	1916	195 M.F.	32	P.	Central plac. præv.	Os=1/-	rs C.G.
19	1916	915 E.W.	31	P.	Marginal plac. præv.	Os=3/-	rs C.G.
20	1916	1013 C.H.	32	P.	Marginal plac. præv.	Os=1/-	rs C.G.
21	1918	768 G.C.	33	P.	Marginal plac. præv.	No note	rs C.G.
22	1919	349 B.H.	30	P.	Central plac. præv.	F.T., not in lab.	rs C.G.
23	1920	57 M.N.	37	M.4	Central plac. præv.	Os=2/-. F.T.	rs C.G.
24	1920	80 E.C.	30	P.	Central plac. præv.	Cervix closed	rs C.G.
25	1920	582 M.W.	35	M.5	Central plac. præv.	?	ra C.G.
26a	1918	1296 M.K.	36	M.3	Plac. præv.	O=2/-	rs C.G.
34	1918	164 E.K.	39	M.2	Central plac. præv.	Heavy loss, 38 wee P. 158, T. 96	rs C.G.
38	1920	800 E.C.	40	M.2	Central plac. præv.	Not in lab. F.T. heavy losses.	rs C.G.
39	1920	842 E.H.	26	P.	Central plac. præv.	In lab. 36 weeks	rs C.G
40	1917	110 M.H.	39	P.	Plac. præv.	In lab. 29 hrs.	rs C.G.
44	1919	110 L.S.	45	M.10	Central plac. præv.	Hæmorrhage off for 24 days	rs C.G.
45	1919	133 A.McG.	32	P.	Plac. præv.	In lab. 12 hrs. rhage off and on for month. 36 weeks p	found to
46	1919	148 M.B.	26	M.3	Complete plac. præv.	In lab. 5 hrs. rhage day before la	extende wall abo yms
47	1919	262 A.R.	34	P.	Central plac. præv.	In lab. 14 hrs.	on R. g os, y. Battl
48	1919	277 M.R.	22	M.1	Marginal plac. præv.	Bleeding on day of	on ant wer uter
49	1919	322 E.F.	34	M.4	Marginal plac. præv.	Bleeding started adm. and continued for 4 days. Op. don when fully dilated	in lower
52	1919	456 E.McC.	37	M.5	Central plac. præv.	In lab. 4 hrs. bleeding for 3 days	central c
53	1919	615 B.S.	34	P.	Central plac. præv.	In lab. 19 hrs.	of plac.
54	1919	633 A.D.	38	M.1	Marginal plac. præv.	Limitation of mov L. hip from early di Induction started day of op. Lab. beg Bougies removed when plac. præv. at 6.20 p.m.	
55	1920	237 E.C.	38	M.3	Marginal plac. præv.	Hæmorrhage 2 no op. and again 27 h	
56	1920	284 K.R.	32	M.3	Complete plac. præv.	op. In lab. 7 hrs. bleeding 17 days be Went to bed and ceased 3 days bef began again off and	lying g on
58	1920	305 A.R.	28	M.2	Complete plac. præv.	Slight bleeding before op. and on	pletely c
59	1920	361 A.T.	29	P.	Complete plac. præv.	Os=1/- In lab. 12 hrs. 10 days before a on day of op. (sev	completely

EVIA.

Technique.	Result. Mother.	Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
rs C.G.	G	G	—	Afebrile
rs C.G.	G.	G.	—	Afebrile
rs C.G.	G.	G.	—	Sl. pyrexia 14 days
rs C.G.	D.	D.	D. from shock and hæm.	—
rs C.G.	G.	G.	—	—
rs C.G.	G.	G.	—	Pyrexia 2 days
rs C.G.	G.	G.	—	Pyrexia 11th to 14th days
rs C.G.	G.	G.	—	Pyrexia 10 days
rs C.G.	G.	G.	—	Afebrile
rs C.G.	G.	G.	—	—
rs C.G.	G.	D.B.	—	T. 99-100°. P. 100 for 8 dys.
rs C.G.	G.	G.	—	Afebrile
rs C.G	G.	D.	—	T. 100° and over. P. 100-120 for 10 days. Lochia offensive for several days. After 10th day slow improvement. Baby lived 1 month
rs C.G.	G.	G.	—	—
rs C.G.	G.	G.	—	Afebrile
ound to cover cervix	G.	G.	—	Satisfactory
extended well up on the wall about 3½ in. above	G.	G.	—	Slight disch. from wound, which improved slowly
on R. side of ant. wall g os, but chiefly pos- . Battledore insertion	G	G.	—	Rise of T. commencing 1st day and subsiding 9th day. Sl. mental symptoms 2 days
on ant. wall extending ower uterine seg.	G.	G.	—	T. for 2 days
in lower uterine seg.	G	G.	—	Transferred to Rest Home
central cord near os	G.	G.	—	Ether brochitis. Transferred to Rest Home.
of plac. over margin of os	G	G.	—	Satisfactory
—	G.	D.B.	—	Satisfactory
—	G.	G	—	—
lying plac. completely g os	G	G	—	Abd. distension for several days
ltely covered by plac.	G.	G	—	—
completely central over os	D.	G.	D. 6 days after Cæs. Sect. Subacute peritonitis	Lower part of wound opened on day of death; profuse straw-coloured turbid fluid

No.	Year.	Reg. No.	and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient a of Operation, especia regards Labour.	Techn
60	1920	362	M.J.	38	M.7	Complete plac. præv.	In lab. 12 hrs. Bl a fortnight before slight, and on day of	omplet
61	1920	507	E.M.	29	M.3, 2 forceps D.B., and 1 Cæs. sect.	Complete plac. præv.	In lab. 3 hrs. Memb. r	ed adh l herni nt to an cision
62	1920	532	M.E.	29	M.1	Complete plac. præv.	Bleeding off and during preg., and seve day of adm. 35 wks	omplet
63	1920	539	S.P.	22	P.	Central plac. præv.	In lab. 18 hrs.	omplet
65	1920	570	M.J.	38	M.3	Central plac. præv.	Bleeding off and fortnight, severe o before adm.	omplet
66	1920	711	L.T.	27	M.2	Partial plac. præv.	Sl. hæm. 37 wks, p	incisio
67	1912	929		—	M.1	Central plac. præv.	—	al
68	1914	421		—	P.	Lateral plac. præv.	—	al
69	1914	1256		—	M.6	Lateral plac. præv.	In lab. after inductio	al and
70	1914	1293		—	M.2	Central plac. præv.	—	al
71	1914	1311		—	M.2	Central plac. præv.	Diabetic coma	al
72	1914	1561		—	M.13	Plac. præv.	Rigid cervix	al
73	1915	143		—	M.2	Central plac. præv.	—	al
74	1915	239		—	P.	Central plac. præv.	—	al
75	1915	310		—	M.10	Central plac. præv.	—	al
76	1915	1278		—	M.2	Central plac. præv.	—	al and
77	1915	1396		—	P.	Marginal plac. præv.	—	al
78	1916	94		—	M.2	Central plac. præv.	Not in lab.	al
79	1916	553		—	P.	Marginal plac. præv.	Not in lab.	al
80	1916	967		—	P.	Central plac. præv.	—	al
81	1916	1211		—	P.	Central plac. præv.	In lab.	al
82	1916	1472		—	M.3	Central plac. præv.	—	al and
83	1916	1867		—	M.5	Central plac. præv.	In lab.	al
84	1916	2061		—	P.	Lateral plac. præv. and C.P.	—	al
85	1917	611		—	M.4	Lateral plac. præv.	—	al
86	1917	1202		—	M.4	Central plac. præv.	—	al
87	1918	68		40	M.6	Plac. præv.	Not in lab.	al
89	1918	844		21	P.	Central plac. præv	Not in lab.	al
90	1918	1322		31	M.2	Plac. præv.	Not in lab.	al
91	1918	1359		30	M.1	Plac. præv.	Not in lab.	al
92	1919	677		36	M.5	Partial plac. præv.	Not in lab.	al
93	1919	949		32	P.	Lateral plac. præv.	In lab.	al
94	1919	1408		30	M.3	Central plac. præv.	Not in lab., double disease	al
95	1919	1689		29	P.	Partial plac. præv.	Not in lab.	al
96	1919	1873		46	P.	Central plac. præv.	Not in lab. (poor), had been plugged	al
98	1920	13		35	M.2	Central plac. præv.	In lab. early	al
100	1920	82		40	M.2	Central plac. præv.	Not in lab. (breech)	al
101	1920	181		39	M.9	Central plac. præv.	Not in lab.	al
102	1920	338		26	P.	Central plac. præv.	Not in lab.	al
103	1920	477		40	M.4	Central plac. præv.	In lab.	al
104	1920	509		28	P.	Partial plac. præv.	Not in lab.	al
105	1920	735		39	M.4	Central plac. præv.	Not in lab. 34 wks.	al
106	1920	766		34	M.4	Central plac. præv.	Not in lab. (good)	al
107	1920	805		35	M.4	Partial plac. præv.	Not in lab.	al
108	1920	813		23	M.1	Partial plac. præv.	Early in lab. (bleedin	al
110	1920	936		39	P.	Plac. præv.	Not in lab.	al
111	1920	1227		36	P.	Plac. præv.	Not in lab.	al

Technique.	Result. Mother.	Result. Child.	If Patient Died, state cause of Death and time after Operation.		Remarks on Puerperium.
completely covering os	G.	G.		—	Uneventful
ed adhesions from old C.G. l hernia. Large intestine nt to ant. abd. wall, opened ncision made	G.	G.		—	Weak and pulseless for several days, but improved
completely covering os	G.	G.		—	Uneventful
completely covering os	G.	G.		—	Satisfactory
completely covering os	G.	G.		—	Satisfactory
incision. Placenta 1 finger	G.	D.		—	Satisfactory. Child lived 3 days
al	D.	D.		—	
al	G	D.		—	
al and hysterectomy	G.	D.		—	
al	G.	G.		—	
al	D.	D.		—	
al	G.	D.		—	
al	G.	D.		—	
al	G.	G.		—	
al	G.	D.		—	
al and hysterectomy	G.	G.		—	
al	G.	G.		—	
al	G.	G.		—	Sl. febrile 2nd week
al	G.	G.		—	Febrile
al	G.	D.		—	
al	G.	G.		—	
al and hysterectomy	G.	D.B.		—	
al	G.	G.		—	Sl. febrile
al	G.	D.B.		—	
al	G.	D.		—	
al	G.	G.		—	
al	G.	G.		—	Sl. febrile
al	G.	G.		—	Sl. febrile
al	G.	G.		—	
al	G.	G.		—	
al	G.	G.		—	Slight pyrexia
al	G.	G.		—	Pyrexia 7th—10th day
al	G.	D.		—	Pyrexia 10th—14th day. Child D. 2nd day
al	G	G.		—	
al	G.	G.		—	
al	G.	G.		—	
al	G.	G.		—	
al	D.	G.	D. 4th day. Heart failure		
al	G.	G.		—	
al	G.	D.B.		—	
al	G.	D.		—	Child D. in a few hrs.
al	D.	D.	D. 5th day		Abd. reopened 4th day for partial intestinal obstruction. Child premature
al	G.	G.		—	
al	G.	G.		—	Sapræmia
al	G.	G.		—	Sapræmia
al	G.	D.		—	

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at Operation, especially as regards Labour.	Tech
112	1920	1270	19	P.	Central plac. præv.	Not in lab; 4 p hæmgs.	sical
113	1920	1355	28	P.	Lateral plac. præv.	Early in lab.	sical
114	1920	1461	41	M.4	Central plac. præv.	Early in lab.	sical
115	1920	1517	44	M. 10	Central plac. præv.	Not in lab.	sical
116	1920	1564	43	M.6	Central plac. præv.	Not in lab. Vagina pl	sical
118	1916	E.M.	41	?	Plac. præv., C.P.	—	sical
119	1917	A.S.	45	M.6	Marginal plac. præv.	Not in lab.	sical
120	1917	E.F.	38	P.	Plac. præv.	—	sical
121	1920	I.L.	37	P	Central plac. præv.	—	sical
122	1920	I.P.	24	P.	Plac. præv.	—	sical
123	1920	E.B.	27	P.	Central plac. præv.	—	sical
124	1915	E.P.	23	P.	Central plac. præv.	In lab. Os not dilated. 7 mths preg	sical
125	1916	F.B.	30	M.3	Central plac. præv.	Emergency. In lab. fully dilated. Vagina	sical
126	1916	G.C.	40	M.2	Central plac. præv.	Emergency. Packed adm.	sical
127	1916	B.L.	34	P.	Marginal plac. præv.	Emergency	Classical. oved fr rus
128	1913	F.C.	28	M.5	Central plac. præv.	Several P.V.'s before	nsverse
130	1920	L.C.	35	P.	Central plac. præv.	F.T. Os=2/-, dilated	nsverse
132	1920	41924 H.C.	22	P.	Incomplete plac. præv. Emergency	Extreme anæmia hæm. Semi-solid plac ext. os with prolapse	t. S.W.G
136	1913	41952 S.D.	38	M.3	Central plac. præv.	In lab. Os=$^2/_5$. R lower uterine segment	s. sect.
140	1920	H.B.	40	?	Lateral plac. præv., C.P.	—	sical
141	1920	B.	26	P.	Central plac. præv.	Exsanguinated	
142	1921	A.	32	P.	Central plac. præv.	7 mths preg.	sical
143	1917	D.	23	?	Central plac. præv.	7½ mths preg. In la	ssical
146	1919	F.G.	31	M.6	Marginal plac. præv.	Not in lab.	sical
148	1919	E.H.	26	M.1	Central plac. præv.	In lab. Os=¼	ssical
149	1920	E.M.	39	P.	Marginal plac. præv.	36th week. In lab. Gas and O=¼. Memb. rupt. tampon of gauze. anæmic	
155	1918	M.B.	39	P.	Marginal plac. præv.	In lab. On account with first pregnancy. managed by midwife hrs. before adm.	ssical, 1
158	1920	200 H.	30	M.4	Central plac. præv.	—	nt. C.G.
159	1919	C.	35	M.1	Central plac. præv.	8 mths preg. Not 1 hæmorrhage	nt. C.G.
160	1920	G.	32	M.3	Marginal plac. præv.	8½ months preg. labour. 1 hæmorrhag	nt. C.G.
161	1920	3148 E.F.	24	M.6	Central plac. præv.	Hæm. 7 days pre again 12 hrs. befo	. S.W.G
162	1913	E.W.	30	M.3	Complete plac. præv., C.P., D.C.4	Not in lab. Vagina tightly With gauze. Pt. h profuse hæms., 5 and before op.	ssical

Technique.	Result. Mother.	Child	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
ssical	G.	D.B.	—	Pyrexia 3rd to 10th day
ssical	G.	D.	—	Child D. 9th day
ssical	D.	G.	Septic intoxication	—
ssical	G.	G.	—	Sapræmia
ssical	G.	G.	—	Pyrexia. Female thrombosis
ssical	G.	?	—	—
ssical	G.	G.	—	Normal
ssical	G.	G.	—	Normal
ssical	G.	G.	—	Normal
ssical	G	G.	—	Normal
ssical	G.	G.	—	Normal
ssical	D.	G.	D. day following op. from shock and loss of blood	—
ssical	D.	D.	D. 6th day. Gen. peritonitis	Peritonitis found P.M.
ssical	D.	D.	D. 6th day. Gen. peritonitis	—
Classical. Small fibro-myoma moved from post. wall of erus	G.	G.	—	Pt. ran a morbid T.
nsverse incision	G.	G.	—	—
nsverse incision	G.	D.B.	—	—
t. S.W.G.	G.	D.B.	—	T. reached 103° 4th day, otherwise afebrile. Macerated fœtus
s. sect. and panhysterectomy	G.	D.B.	—	T. over 100° for 3 weeks
ssical	D.	?	D. shortly after op. Uterus would not contract, and pt. D. from P.P.H.	—
	G.	G.	—	Afebrile
ssical	G.	D.	—	Afebrile. Child lived 3 days
ssical	G.	G.	—	Afebrile
ssical	G.	G.	—	Pyrexia. Pulmonary embolism, intestinal obstruction, by band of omentum adherent to uterus, on 7th day. Laparotomy. Recovery
ssical	G.	G.	—	Apyrexial
Gas and oxygen, novocaine	G.	G.	—	Severe pyrexia, wound sepsis and bronchitis. On 8th day wound re-sutured under stovaine lumbar as it threatened to burst. Good recovery
ssical, 1 layer silk	D.	G.	D. 6th day, peritonitis. Uterus septic	—
nt. C.G.	G.	G.	—	—
nt. C.G.	G.	G.	—	—
nt. C.G.	G.	G.	—	—
. S.W.G.	G.	G.	—	—
ssical	G.	D.	—	Child D. in hosp. 19 dys later

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at ... of Operation, especially as regards Labour.	Techn
166	1913	H.S.	36	P.	Central plac. præv.	Cervix intact. Thick ... covering int. os. Bleed... fusely on exam.	and C.G.
169	1912	937 J.P.	27	M.1, craniotomy	Lateral plac. præv., C.P., C.V. $3^7/_{12}$	Adm. with hæm. No p... Os = 5/-. Steady loss of ... continued	yers C.G.
170	1914	60 N.	39	M.3	Partial plac. præv.	Lost "half a pint of bl... Not in lab.	silk
171	1914	434 F.S.	29	M.2	Central plac. præv.	30 weeks preg.	S.W.G.
172	1914	438 A.D.	39	M.1	Partial plac. præv.	Term	S.W.G.
173	1918	469 M.D.	42	M.10	Central plac. præv.	Adm. with history of h... Started losing again ... P.V.'s	sical
174	1920	210 E.H.	41	M.7	Central plac. præv.	38 weeks. Collapsed ... 6 weeks intermittent hæ...	S.W.G.,
176	1913	2847 E.C.	32	P	Central plac. præv.	Fair, P. rapid. Not in ...	silk
177	1916	1248 K.B.	27	M.2	Marginal plac. præv.	8 mths. 1 hæmorrhag... before adm. Not in lab.	yers silk
178	1916	1336 E.B.	39	M.8	Marginal plac. præv.	34 weeks preg. Bled... for at least 16 hrs. No... lab.	and C.G
180	1916	1400 A.W.	31	M.4	Central plac. præv.	Emergency. In lab. Os=... Profuse hæm. Blanched	yers silk
181	1919	415 M.C.	29	M.3	Central plac. præv.	Lost blood for 14 d... Bleeding freely on adm. ... lab. Os slightly dila... Vagina plugged	yers silk
182	1919	L.G.	24	P.	Lateral plac. præv.	8 months. Slight loss ... blood for 1 week. Not ... lab.	
183	1917	A.G.	39	—	Central plac. præv.	?	sical
185	1914	E.H.	38	M.1, Cæs. sect.	Plac. præv.	8 months preg.	sical
186	1915	H.H.	23	M.1	Plac. præv.	?	sical
187	1920	K.	31	M.1	Partial plac. præv.	8 months preg. Se... hæm. Not in lab.	and C
190	1920	E.	25	P.	Complete plac. præv.	$7\frac{1}{2}$ months. Contin... attacks of bleeding, n... very severe, for many w... Anæmic.	yers C.G
191	1919	B.L.	32	P.	Plac. præv.	Os = 2/-, 8 months preg.	sical
192	1920	A.D.	25	P.	Lateral plac. præv.	8 months preg. Much b...	
193	1920	E.J.	43	M.9	Plac. præv. Concealed accidental hæmorrhage	Not in lab. State ... bad. Œdema of lung. ... slight hæm. Rapid rising ... Suspected concealed accid... tal hæm. from large in... uterine mass. Toxæ... much alb.	Porro Ca... with t

Technique.	Result. Mother.	Child.	If Patient Died, state cause of Death and time after Operation.	Remarks on Puerperium.
and C.G.	G.	G.	—	—
yers C.G.	G.	G.	—	1rreg. T. for 2 weeks, reachin 100°
silk	G.	G.	—	T. 100° occasionally for 2 dys
S.W.G.	G.	G.	—	Uneventful.
S.W.G.	G.	G.	—	Uneventful
sical	D.	D.	D. 3rd day	T. 103° 2nd day. Child D. 7th day
S.W.G., 2 C.G.	G.	G.	—	Phlegmasia alba dolans, L.
silk	D.	G.	D. 2nd day. Acute dilatation of stomach	—
yers silk	G.	D.	—	Child prem. D. 12 hrs. later. T. 100° first 3 days, 100° on 3 occasions
and C.G.	G.	G.	—	T. 101° 2nd day, 100° 3rd and 4th day, then normal
yers silk	G.	D.	—	T. ranged between 101-102° for 10 days, then gradually settled. Child lived 1 day
yers silk	G.	D.	—	T. 101° on 3rd, 4th and 6th days
	G.	G.	—	6th day femoral thrombosis both legs. Good recovery
sical	G.	G.	—	—
sical	G.	G.G.	—	Twins
sical	G.	G.	—	—
and C.G.	G.	G.	—	Pt. had pulmonary tuberculosis
yers C.G.	G.	D.	—	Child had meningocele, and D. 2nd day
sical	G.	G.	—	Afebrile
	G.	D.	—	Severe puperal sepsis for 3 weeks *Child.* Anencephalic. Complete exomphalmos. No cord at all. Edge of placenta continuous with membranes and body wall. Velamentous vessels. Spina bifida. Imperforate anus. Version impossible. Lived ½ hour
orro Cæsarean. Hysterec. by with tourniquet	D.	D.B.	D. 4th day. Œdema of lungs	*Remarks on op.* Free blood in peritoneal cavity. Numerous ecchymoses in uterine wall, which was very œdematous and very soft. Placenta in lower zone and several pounds of clot in cavity

No.	Year.	Reg. No. and Name.	Age.	No. and Details of Previous Labours.	Indication.	Condition of Patient at ... of Operation, especially as regards Labour.	Techn...
194	1917	E.C.	24	M.3, all D.B.	Incomplete plac. præv.	In lab. 18 hrs. M... rupt. 6 hrs. Os=½. E... for 7 days.	C.G. and
195	1920	M.W.	31	P.	Partial plac. præv.	Hæm. for 7 weeks pri... lab.	W.G.
196	1919	J.L.	?	M.3	Central plac præv.	Some hæm. 17 hrs. be... Pains began 4 hrs. befor...	
197	1918	E.B.	28	P.	Lateral plac. præv.	Exhaustion from los... blood. Bleeding for 3 ... Os=2/-	yers C.G.
198	1912	M.A.	35	M.3	Partial plac. præv.	Lab. commencing	ayers C.G.
199	1916	M.B.	35	P.	Partial plac. præv.	Lab. commencing	ayers C.G.
200	1920	G.L.	39	M.1	Partial plac. præv.	Lab. commencing	ayers C.G.
201	1920	E.C.	39	M.8	Central plac. præv.	Lab. commencing, Os... Several P.V.'s	ayers C.G.
202	1920	E.H.	28	M.3	Partial plac. præv.	Os=2/-	ayers C.G.
203	1920	E.G.	43	M.10	Central plac. præv.	In lab,	ayers C.G.
205	1920	2694 E.M.	37	M.6	Central plac. præv.	38 weeks preg. Ear... lab. 2 hæms.	W.G.
206	1920	2275 W.S.	22	M.2	Central plac. præv.	Not in lab. 2 hæ... week and just before o...	

Special thanks are due to those members of the Hospital Staffs who prepared the tables of cases from the Hospital records; among these, whose names the author knows of, are the following :—J. W. Bride and Addis, Manchester; D. M. Lindsay and J. Hewitt, Glasgow; A. H. Hendry, Liverpool; Alfred Gough, Leeds; Hilda Shufflebotham, Birmingham; John Chisholm, Sheffield; Gilbert Strachan, Cardiff; Louis Cassidy, Dublin; C. H. Bracewell, A. Gray, A. Goodwin, J. B. Hunter, A. McAllister, A. J. McNair, A. C. Palmer, A. H. Richardson, H. G. Taylor, London.

Technique.	*Result.*		*If Patient Died, state cause of Death and time after Operation.*	*Remarks on Puerperium.*
	Mother.	*Child.*		
C.G. and cont. silk	G.	G.	—	Pyrexia for 7 days
.G.	G.	G.	—	Pyrexia first 6 days
	G.	D.	—	Uneventful. Child lived 9 hrs.
yers C.G.	G.	G.	—	—
yers C.G.	G.	G.	—	—
yers C.G.	D.	G.	Moribund at time of op.	—
yers C.G.	G.	G.	—	—
yers C.G.	G.	G.	—	—
yers C.G.	G.	D	—	Stitch abscess at bottom of incision
yers C.G.	G.	G.	—	—
W.G.	G.	G.	—	Afebrile
	G.	G.	—	Afebrile

List showing, for Tables IX—XV, the case-numbers belonging to the various Hospitals; as each case has its year, registered number or initials of the patient, Tables IX—XV will form a permanent record for the Hospital of these classes of case. The numbers under each column are inclusive; in the third column, the numbers comprise *all* cases of Antepartum Hæmorrhage, but Table XV contains the cases of Placenta Prævia only.

	Tables IX–XIII Contracted Pelvis	Table XIV Eclampsia	Table XV Plac. Prævia
St. Mary's Hospitals, Manchester	1—577	185—197	1—25
Glasgow, Roy. Mat. & Wom. Hos.	620—1015	57—63	26—26, A.
Jessop Hosp. for Wom., Sheffield	1016—1300	203—220	27—39
Liverpool, Maternity Hospital...	1301—1575	198—200	40—66
Queen Charlotte's Hospital ...	1576—1815	1—53	67—116
Leeds, General Infirmary ...	1816—1837	224—231	118—119
Leeds, Wom. & Children's Hosp.	1838—1907	221—223	117
Leeds, Maternity Hospital ...	1908—2033	—	120—123
Birmingham Maternity Hosp. ...	2034—2202	162—164	124—131
London Hospital...	2203—2322	106—130	132—136
Newcastle Royal Infirmary ...	2323—2435	—	137—143
Guy's Hospital	2436—2520	86—93	144—149
Rotunda Hospital, Dublin ...	2521—2592	173—195	150—155
Belfast Maternity Hospital ...	2593—2665	165—168	156—160
St. Bartholomew's Hospital ...	2666—2736	69—78	161
City of London Maternity Hosp.	2737—2806	131—142	162—168
G.L.I. Hosp., York Rd., London	2807—2869	152—161	169—174
University College Hospital ...	2870—2924,H.	—	175—176
St. Thomas' Hospital	2925—2968	94—105	—
Middlesex Hospital	2969—3006	143—147	177—181
Royal Free Hospital, London ...	3009—3044	169—172	182
Women's Hospital, Birmingham	3045—3081	82—85	183—186
Greenock Infirmary	3082—3119	—	187
Bradford Royal Infirmary ...	3120—3151	176—184	188—191
Bristol Royal Inf. (Dr. Swayne)	3152—3172	66—67	—
Dublin, National Mat. Hospital	3176—3190	—	—
Dublin, Dr. H. Tweedy ... ... (other than Rotunda)	3173—3174	68	—
Dublin, Sir W. Smyly ... ... (other than Rotunda)	3175	—	—
Dublin, Dr. B. Solomons ...	3191—3200	—	—
Bristol Gen. Hosp. (Dr. Rayner)	3201—3223	—	—
St. Luke's Hospital, Bradford ...	3224—3245	55—56	194—195
Birmingham General Hospital ...	3246—3265	—	—
Dundee Royal Infirmary... ...	3266—3285	202	196
Westminster Hospital	3286—3305	201	—
King's College Hospital ...	3306—3322	79—81	197
Belfast Samaritan Hospital ...	3323—3338	54	—
Ulster Hosp. for Women & Ch.	3339—3353	—	—
Liverpool Royal Infirmary ...	3354—3368	148	198—203
St. George's Hospital, London ...	3369—3383	149—151	204
Cardiff Infirmary	3384—3398	—	—
St. Mary's Hospital, London ...	3399—3405	64—65	205—206
Great Northern Hosp., London	3406—3408	—	—

The Limitations of Cæsarean Section.

By G. Blacker, C.B.E., M.D. (Lond.), F.R.C.P. (Lond.), F.R.C.S. (Eng.).

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The modern operation of Cæsarean section performed on suitable cases and in suitable surroundings, in which perfect asepsis can be assured, is accompanied by such good results both for the mother and the child, that there is a great and increasing danger of its being performed on unsuitable cases and in unsuitable surroundings in the expectation of obtaining equally good results.

Even a cursory study of modern medical literature shows that this is so, and that many practitioners with an inadequate conception of the real dangers attending this operation are resorting to it for all sorts of varying obstetric conditions in which the proof that it is the safest procedure for both the mother and the child has yet to be furnished. What are we to think when we find cases recorded in the literature in which the indications for the operation are given as uterine inertia, epilepsy, hydramnios, varicose veins and abdominal pain! We can only conclude that the operative zeal of the practitioner has outstripped both his knowledge and his judgment.

It would seem that the great increase in the number of these operations of recent years has led not to a better and more precise knowledge of the indications for their performance, but rather to such an unjustifiable widening of these indications as to call for the very serious consideration of those engaged in teaching the science and art of obstetric medicine. The time has certainly come when it is worth while to examine critically the varying conditions in which many practitioners are resorting to the performance of Cæsarean section as a means of dealing with certain obstetric difficulties.

It will be well to examine first of all the common statement that Cæsarean section is a simple and safe operation. If this is really so then much of the criticism directed towards the increase in the number of indications for the operation must fall to the ground. That the classical operation as generally performed is a simple and relatively safe procedure requires little proof; it is, and the necessary technique is well within the scope of anyone with any pretensions to being a surgeon. Indeed it is this very ease and simplicity of the operation which is so likely to lead to its abuse.

That it is a relatively safe operation when performed on carefully selected patients in proper surroundings is equally true, but even under these conditions there is a minimal maternal mortality associated with the operation which it is unlikely will ever be abolished entirely. Bar has recorded a succession of 97 cases with no maternal or fœtal deaths, and as long ago as 1905 Schauta recorded a series of 128 cases with no maternal deaths. In the series of 4,197 cases collected by Munro Kerr and Holland (operated upon by British surgeons during the years 1911—1920), among 1,591 cases operated upon for pelvic contraction before the onset of labour, or early in labour, there were only 26 deaths, or a maternal mortality of 1.6 per cent.

Cæsarean Section.

	Cases.	Mat. Mort.
Bar	97	0
Schauta	128	0
Munro Kerr and Holland...	1591	26=1·6%
Amand Routh	469	14=2·9%

We may therefore regard the danger to the mother when the operation is carried out in the best possible conditions as not more than 1.5 to 2 per cent. In this, as in every other operation, it is easy to find long series of cases recorded with no maternal mortality, but no matter how skilful the surgeon if only he performs a sufficient number of any given operation he will not in the end escape the minimal mortality. The carrying through of a modern aseptic operation necessitates the co-operation of some four or more persons, and however careful the individual may be, he can never be absolutely certain of those who assist him and sooner or later one of the links in the chain will break and lead to disaster.

The splendid results recorded by Bar have only been obtained by the most scrupulous care in the selection of the cases; for example, he never operates in any case in which there is a possibility of the patient being infected, and he practises only the classical method and does not resort to any of the more modern methods of transperitoneal or extraperitoneal section.

While then everyone will admit that Cæsarean section as an operation of election for cases of contracted pelvis can be practiced with a minimal risk of some 1.5—2 per cent., what are the results in the cases when the patient has been some time in labour or when there is some chance of her being infected Munro Kerr and Holland's figures show 22 deaths among 220 women operated upon late in labour, or a death rate of 10 per cent., and 29 deaths among 107 cases operated upon after attempts had been made to deliver with forceps or craniotomy had been performed, a mortality rate of no less than 27 per cent.

The figures published by Amand Routh[3] for the twenty years 1891—1910 tell the same story; in the 469 clean cases the mortality was only 2.9 per cent., while in the 230 cases in which the membranes were ruptured or in which frequent examinations or attempts at delivery had been made the maternal mortality was as much as 17 per cent.

Cæsarean Section.

	Cases.	Mat. Mort.	
Munro Kerr and Holland...	220	22=10%	Late in labour.
„ „ ...	107	29=27%	After application of forceps.
Amand Routh	230	40=17·3%	Membranes ruptured, or frequent examinations, or after application of forceps.

It is obvious then that while in carefully selected clean cases of contracted pelvis the mortality of Cæsarean section is not more than 1.5—2 per cent., in cases in which there is some probability of the mother being infected it varies from 11—27 per cent. It is imperative in any consideration of the limitations of Cæsarean section that these facts should be carefully borne in mind.

Among the causes of death in Munro Kerr and Holland's cases were general peritonitis, septicæmia, pulmonary embolus, cardiac failure, hæmorrhage and intestinal obstruction. Theoretically, those due to infection should be preventible, but as I have already pointed out it is impossible for any one operator, however careful he may be, to ensure perfection in the technique of so complicated a procedure as an abdominal section, and therefore it is unlikely that the risk of infection will ever be eliminated entirely. A pulmonary embolus again is an accident beyond the control of the surgeon and one which no amount of care or skill can avoid with certainty.

Besides, however the immediate risks attending the operation there are other possible consequent disabilities which must not be lost sight of.

Of these the most important and the most dangerous is the risk of rupture of the scar in a subsequent pregnancy. This subject has been very fully considered in an admirable paper published by Eardley Holland,[4] and he has collected 18 instances of rupture of the scar in a series of 448 cases, or a frequency of 4 per cent. The main factor in the production of such ruptures appears to be infection of the uterine wound, while other possible causes are

imperfect methods of suture and the employment of unsuitable suture material. The morbidity of cases of Cæsarean section is undoubtedly high. Holland points out that among 84 cases from the London Hospital and the City of London Maternity Hospital, in only 38 was the convalescence afebrile, a morbidity rate of 55 per cent., and this is in accord with my own experience, and is not surprising when we consider the extreme likelihood of the uterine wound becoming infected from the genital tract.

In the classical operation as ordinarily practised there is some risk of adhesion of intestine or omentum to the uterine scar, or to the abdominal incision; this, however, is a danger attaching to every abdominal section, is not a matter of much moment, and indeed in repeated Cæsarean sections may even be of advantage to the patient in rendering the second or any subsequent operation more or less extraperitoneal.

If now we pass to a consideration of the various conditions for which a Cæsarean section may be necessary the first and most important is in the treatment of cases of contracted pelves. Of recent years a marked increase has taken place in the number of cases treated in this way with, on the whole, good results for both the mothers and the children.

There are a variety of procedures available for the treatment of a case of pregnancy complicated by a contracted pelvis, and in order to come to a correct conclusion as to the proper position of Cæsarean section among these procedures, it is necessary to consider the average results both for the mothers and the children which are associated with them at the present time.

No one will deny that the best that can happen to a woman with a contracted pelvis is that she should deliver herself unaided, since there is no method of delivery in these cases which is associated with so little risk both to the mother and the child as spontaneous delivery.

The figures of Schauta[2] furnish the best proof of this fact. In 5,288 cases of contracted pelves among 49,397 births, in 4,116, or 77.8 per cent., of the cases the patients delivered themselves spontaneously with 4 maternal deaths, or a mortality of .09 per cent., and with 91 fœtal deaths, or a mortality of 2.2 per cent. The morbidity rate, a case being classed as morbid if the temperature had once risen to 100.4 F., was only 4.1 per cent., a lower rate than can be obtained by any other method of treatment. It must be remembered that these figures are by no means exceptional, and agree with the experience of many other obstetricians, and it is certain that a very large number of cases of the lesser degrees of contracted pelvis will deliver themselves spontaneously with the best results if they are only allowed to do so.

In the event, however, of the case being one in which spontaneous delivery cannot be hoped for what alternative methods of procedure can be adopted? Shortly, they include the induction of premature labour, the application of forceps or the performance of prophylactic version, the carrying out of such surgical procedures as pubiotomy or Cæsarean section, or lastly, craniotomy of the living or of the dead child. In the great majority of lying-in hospitals in this country at the present day the treatment of cases of contracted pelvis is limited very largely to the three procedures—induction of premature labour, the occasional application of the forceps to the head at or above the brim, and the performance of Cæsarean section. Prophylactic version is hardly ever practised in uncomplicated cases, and pubiotomy appears to meet with little favour among English obstetricians. In considering the treatment of cases of pregnancy with a contracted pelvis they may be divided up into three main classes, those in which the relative size of the child and the pelvis is such that spontaneous delivery at full time may be anticipated, those in which the delivery of a living child which will survive and grow up is probable if premature labour is induced, and lastly a third group in which neither of these contingencies is likely to occur and which will require to be treated by Cæsarean section.

The application of the forceps to the head above the brim is an operation which should not be performed if it can be avoided, and in deciding upon the treatment of a case of contracted pelvis the patient should not be allowed to come into labour with the intention on the part of the medical attendant of completing the delivery by this operation. When this procedure is necessary it is evidence of an error of judgment, as the difficulty should have been avoided either by the induction of premature labour or by the performance of Cæsarean section. Schauta's[5] figures and those published by Munro Kerr[6] show how unsatisfactory are the results of the application of the forceps to the head at or above the brim. Schauta records 147 cases with a maternal mortality of 1.3 per cent., and a fœtal mortality of 38.7 per cent., while Munro Kerr's figures give a fœtal mortality in pelves with a conjugate diameter of from 3 to $3\frac{3}{4}$ inches of from 25 per cent. in the higher degrees of contraction to 10 per cent. in the lower.

Careful examination of the relative size of the head and of the pelvis more particularly by Munro Kerr's method, if necessary under anæsthesia, will usually enable a correct decision to be arrived at as to the likelihood of spontaneous delivery, but cases are bound to occur from time to time in which as a result of error in the estimation of the relative size of the head and pelvis, undue hardness of the fœtal head or from inefficient uterine contractions

the patient fails to deliver herself. In these circumstances it may be impossible to avoid the application of the forceps to the head at or above the brim, but in any subsequent pregnancy (in view of the bad results both for the mother and the child) any necessity for the repetition of this procedure should be avoided by the induction of premature labour or by the performance of Cæsarean section.

Some obstetricians, whose views are entitled to every consideration, in such cases in which the forceps fail to deliver the child, advise that pubiotomy should be performed always provided that the child is uninjured and the surroundings suitable. As I have already stated this operation does not meet with much favour among English obstetricians, and when we examine its average results this is not surprising.

Whether the operation is done by the open or the so-called closed or subcutaneous method it really results in a compound fracture of the pelvis in what must be considered as a very septic region. With a careful selection of cases and in the most skilled hands the results both for the mothers and the children show a progressive improvement; thus Schläfli[7] records a series of 664 cases of pubiotomy with a maternal mortality of 4.96 per cent, and a fœtal mortality of 9.18 per cent., while Römer[8] published a further series of 300 cases with a maternal mortality of only 2.6 per cent. and a fœtal mortality of 6.6 per cent., and Menge[9] records 104 cases with no maternal and only 7 fœtal deaths. The figures for symphysiotomy show a corresponding fall; thus in 316 cases of subcutaneous symphysiotomy collected by Menge[9] there was a maternal mortality of 2.84 per cent. and a fœtal mortality of 10 per cent.

Pubiotomy.

	Cases.	Mat. Mort.	Fœtal Mort.
Schläfli	664	4·96%	9·18%
Römer	300	2·6%	6·6%
Menge	104	0	6·7%

Symphysiotomy—Subcutaneous.

	Cases.	Mat. Mort.	Fœtal Mort.
Menge	316	2·84%	10%

The operation is, however, essentially one for the expert; it is difficult to carry out and very likely to result in considerable damage to the mother's soft parts unless carefully performed. No doubt in a few selected cases it may be the best means of avoiding craniotomy on the living child and be less dangerous than Cæsarean section, but the necessity for its performance should seldom arise, and when it does either indicates an error of judgment on the part of the medical attendant or a failure on the part of the

uterine contractions, both of which of course may occur from time to time.

The difficulty in dealing with this class of case lies in the fact that when the patient has been allowed to go to full time in the expectation that she will deliver herself and does not do so, the practitioner, if he fails to deliver with forceps, must either deliver by pubiotomy or Cæsarean section, with their attendant dangers, or perforate the living child.

It is precisely in these difficult circumstances that many obstetricians at the present day, unwilling to expose the mother to the risks of pubiotomy or prejudiced against the operation, are resorting to delivery by abdominal section. Is this justifiable or is it not? Individual cases must of course be decided upon their merits, but considering the matter generally and taking into account the bad results which follow Cæsarean section in such cases, it is difficult to avoid the conclusion that it is not. What justification can there be for an operation which involves a maternal mortality of at the lowest 11 per cent., and at the highest 27 per cent. It may be argued that improved technique and improved methods will lead to a decrease in the danger to the mother, but is this so, or even if it were, would a decrease of say 5 per cent. in the maternal mortality be sufficient to warrant exposing the mother to even such a diminished danger for the sake of an unborn but living child? I would say emphatically no, it is of the utmost importance that the relative values of the life of the mother and that of the child should be regarded from the proper standpoint. In my opinion, and I believe that in this I should be supported by the great majority of obstetricians of experience, it is rarely if ever justifiable to save the life of the child at any grave risk of increasing the danger to the life of the mother. It must be remembered that in most cases the patient is a young woman in the prime of life, possibly the mother of a number of young children who specially therefore need a mother's care, and in nearly all cases the potential mother of possibly several more children. It may be argued that the danger of a craniotomy, the only alternative left, is considerable, but this is not so. Craniotomy carried out on a patient who has not been damaged by useless and unskilled attempts at delivery, a condition of things which should never occur at the present time, and which as a matter of fact occurs much less commonly than it did even some ten to twenty years ago, is an operation accompanied by little danger to the mother and is infinitely less dangerous when the patient is possibly infected, than either pubiotomy or Cæsarean section. This point is well illustrated by Schauta's figures; he records among 49,497 births, 82 cases of craniotomy on dead children with 5 maternal deaths, or a mortality of 6 per cent., and

76 cases of craniotomy on living children with 1 maternal death, or a mortality of 1.3 per cent.

Craniotomy.

Schauta	Cases.	Mat. Mort.
Child dead	82	5=6%
Child alive	76	1=1·3%

No obstetrician undertakes such an operation as a craniotomy on a living child without the greatest repugnance, but to pretend that this operation can be replaced without greater danger to the mother by such procedures as pubiotomy or Cæsarean section, no matter how skilful the attendant, is to shut one's eyes to the truth. Midwifery practice is one of the most exact of all branches of medicine, but it is impossible for anyone, no matter how careful he may be, to avoid errors of judgment from time to time, and when from such an error danger results either to the life of the child or to that of the mother, the latter must be safeguarded in every case, even if it involves sacrificing the life of the child. Every obstetrician of any experience can recall cases in which it has been necessary to craniotomise one or even two children, and in which subsequently the mother has been delivered by the natural passages of a number of healthy living children who have survived and grown up as a result of the induction of premature labour. At the present time it is not a question of considering craniotomy in the higher degrees of pelvic contraction; this is rarely called for since these cases are readily diagnosed; the cases which arise are those of the lesser degrees of pelvic contraction in which an error has been made in the estimation of the relative size of the head and of the pelvis, and in which the medical attendant is tempted to resort to Cæsarean section rather than to perform craniotomy on the living child when forceps have failed to deliver. It is to be hoped that the results published by Munro Kerr and Holland demonstrating clearly as they do the great danger to the mother of such a procedure will tend to diminish the number of Cæsarean sections practised under these conditions.

In the event of a Cæsarean section being decided upon in a possibly infected case, should it be followed by hysterectomy or should one of the more modern methods of extraperitoneal or transperitoneal section be performed through the lower uterine segment?

The safest procedure is undoubtedly a Cæsarean hysterectomy, but is it justifiable to practice a mutilating operation of this kind on a young woman for the sake of her child, even if the risk it entails to her is a comparatively small one, when the sacrifice of

the child would enable her to retain her uterus and probably to give birth to several more children? The possible degree of the infection in any case is always doubtful; it may even not be present, and it is well known how readily patients recover, with proper treatment, from the lesser degrees of septic infection.

It has yet to be shown that the so-called extraperitoneal section or the performance of the operation through the lower uterine segment intraperitoneally diminishes to any great degree the risk of infection, and it is a debatable point whether greater security is not obtainable by Bar's procedure of eventrating the uterus in all doubtful cases so as to avoid any possible infection of the peritoneal cavity by the liquor amnii. It has been suggested that the practice of incising the uterus through the lower uterine segment, whether by the extraperitoneal or by the transperitoneal method, will lower the mortality and lessen both the risk of infection and that of rupture of the scar in any subsequent pregnancy. This, however, has yet to be proved. The operation is rather more difficult, the extraperitoneal method very likely to be accompanied by injury to the bladder, and it is a question whether infection of the uterine wound is not more likely to arise when the incision is in the lower uterine than when it is in the upper uterine segment. At the same time the results obtained are very striking. Vogt[10] has collected 76 cases of Cæsarean section with the low intraperitoneal incision, all possibly infected, and twelve severely so, with only two maternal deaths. Küstner[11] has recorded 55 cases, probably infected, treated by the extraperitoneal low incision with no deaths from infection. Martius[12] has collected 611 cases of extraperitoneal cervical section with 30 maternal deaths, or a mortality of 4.4 per cent., and 385 cases of intraperitoneal cervical section, of which half are described as probably infected, with 14 deaths, or a maternal mortality of 3.6 per cent.

Cæsarean Section.

	Low Incision.		
	Cases.	Mat. Mort.	
Vogt	76	2=3·6%	
Küstner	55	0	extraperitoneal.
Martius	611	30=4·4%	"
"	385	14=3·6%	intraperitoneal.

The question whether this variety of incision is less likely to be followed by rupture of the scar has yet to be decided; there are already three cases of rupture recorded in the literature, one by Franz,[13] one by Wolff,[14] and one by Vogt.[15]

In considering the good results obtained by these methods, it must be remembered that most of the cases have been operated

upon by experts in the best surroundings, and any great increase in the number of these operations will certainly increase the death rate.

If we may, then, summarize our conclusions with regard to the performance of Cæsarean section in cases of contracted pelves it may be said that as an operation of election in suitable cases in suitable surroundings it gives good results, but that up to the present time the risk of the operation when performed late in labour or after attempts have been made to deliver by forceps, is so great that the classical operation in these conditions is unjustifiable and should not be performed; and it has yet to be shown that the low incision will lower the death-rate to such a degree as to render even this variety of the operation justifiable in possibly infected cases. It is further unlikely that the substitution of pubiotomy or symphysiotomy for Cæsarean section in these cases will be associated with so small a risk to the mother as to render them justifiable, and we are therefore driven to the conclusion that in cases in labour in which the forceps fail to deliver the patient, resort should be had even to craniotomy of the living child, and that it is not justifiable to subject the mother to the risks inseparable from a Cæsarean section practised in these conditions. Craniotomy on the living child is to be avoided not by the performance of a Cæsarean section late in labour with its attendant dangers, but by the treatment of a larger number of cases of the lesser degrees of contracted pelvis by the induction of premature labour, or, when this procedure has previously given bad results in any given case, by the performance of Cæsarean section on the patient before the onset of labour, that is to say before there is any possibility of her having become infected. Any patient who has once been delivered with difficulty by high forceps should not be allowed to go to full time again unless it has been decided that the case is one for Cæsarean section, but should have induction of premature labour carried out.

It may be objected and indeed has been that the risk to the child from the induction of premature labour is so high that this method of dealing with the lesser degrees of contracted pelvis should be limited as much as possible. During the years 1910—1920 inclusive, in the lying-in ward at University College Hospital, 205 cases of contracted pelvis have been treated by the induction of premature labour with no maternal deaths and 29 fœtal deaths, or a fœtal mortality of 16.4 per cent. Labour is always induced by the introduction of bougies followed in a few cases by the use of a bag, it is induced as near the 34th week of pregnancy as possible, and carried out with proper precautions in this way it is free from any danger to the mother and is attended with relatively good

results to the children. Eden[17] records a series of 102 cases at Queen Charlotte's Hospital treated by induction of premature labour with no maternal mortality and a fœtal mortality of only 13 per cent. It must be admitted, of course, that the results to the children would be better if Cæsarean section was done in all these cases, but this would be at the risk of one or two mothers' lives being sacrificed in an attempt to save some 10 or 12 fœtal lives, and who could justify the running of such a risk?

Induction of Premature Labour.

	Cases.	Mat. Mort.	Fœtal Mort.
Univ. Coll. Hosp.	205	0	16·4%
Queen Char. Hosp. ...	102	0	13%

There has been a growing desire of late years on the part of obstetricians to find some method of treating cases of placenta prævia which would lead to a diminution of the, at present, large fœtal mortality without increasing the risk to the mother. The ordinary methods of treatment are undoubtedly associated with a very grave risk to the life of the fœtus, and it is inevitable that this should be so. Is Cæsarean section a mode of dealing with these cases which can be practised with safety both immediate and remote to the mothers, and which at the same time will definitely diminish the high fœtal death-rate inseperable from such methods of treatment as version or the use of a hydrostatic dilator? It is important to remember that only some 33 per cent. of cases of placenta prævia go to full time, and therefore that in a large proportion of the cases we are dealing with a premature child and must expect a high death-rate, quite apart from the special dangers to the fœtus associated with a low implantation of the placenta.

During the years 1910—1920, in the lying-in ward at University College Hospital,[16] we have treated 59 cases of placenta prævia, of these 50 were confined prematurely, only 9 going to full time. In 58 of the cases labour was terminated either naturally, by rupture of the membranes, by the introduction of a bag, or by version. Two of the mothers died, one of acute tuberculosis on the tenth day after delivery, that is from an intercurrent disease which bore no relation to the complication of labour, and one from rupture of the lower uterine segment and cervix, a case of twins with hydramnios and placenta prævia, a maternal mortality, excluding the first case, of 1·7 per cent. Of the children, 12 were born alive, and 49, or 80 per cent. were born dead. In the remaining case Cæsarean section was performed and the patient died of acute dilatation of the stomach on the third day, the child surviving. The maternal results in this series of cases are extremely good, the fœtal results very bad. The great majority of these cases were treated by the

resident officers and they are therefore a good example of the results to be obtained in the treatment of placenta prævia when carried out under ordinary conditions in a lying-in institution. If we examine larger series of cases we find that Hitschmann[18] records 501 cases treated by version with 6 maternal deaths, or a maternal mortality of 1.2 per cent., and 532 cases treated by a hydrostatic bag with 10 maternal deaths, or a mortality of 1.9 per cent. The figures given by Jellett for the Rotunda Hospital show a maternal mortality of 3.6 per cent., and a fœtal mortality of 57.3 per cent.

Placenta Prævia.
Treated by other methods than Cæsarean Section.

	Cases.	Mat. Mort.	Fœtal Mort.
Univ. Coll. Hosp.	58	1=1·7%	49=80%
Hitschmann	501 (version)	6=1·2%	—
Hitschmann ...	532 (bag)	10=1·9%	—
Jellett	138	5=3·6%	57·3%

In a series of 191 cases of placenta prævia treated by Cæsarean section recorded by Hitschmann, 7 of the mothers died, or a maternal mortality of 3.6 per cent., and the fœtal mortality varied from 20—40 per cent. Munro Kerr and Holland's table show 139 cases operated upon for placenta prævia by Cæsarean section, with 16 deaths, or a maternal mortality of 11.5 per cent., and a fœtal mortality of 7 per cent.

Treated by Cæsarean Section.

	Cases.	Mat. Mort.	Fœtal Mort.
Hitschmann	192	7=3·6%	20·40%
Munro Kerr and Holland...	139	16=11·5%	7%

The maternal mortality in these latter cases is much higher than it should be, and it is obvious that a number of cases must have been operated upon in unsuitable conditions. Admitting for the moment that the maternal mortality is capable of reduction to some extent, we are again confronted with the question, are we justified in increasing the risk to the mother for the sake of the child. I believe the answer to this to be that, unless the risk to the mother can be reduced to a figure corresponding to that obtaining when these cases are treated by the older methods we are not justified, except in a small selected class of cases, in practising Cæsarean section for the sake merely of reducing the fœtal mortality. Here again it is a question of the relative value of the two lives, and to that there can be only one reply, the life of the mother must be regarded as infinitely more precious than that of any unborn child. From time to time certain cases of placenta prævia will be met with

in which Cæsarean section is the best and the proper treatment; a case, for example, in which there is a markedly overlapping or central placenta prævia, with rigid soft parts, in a primigravida or even in a multipara with a living child at or near full time. But such cases do not often occur, and if Cæsarean section is to become the routine treatment for cases of placenta prævia then the operation must be performed early in cases in which the ordinary methods of treatment can be adopted with less risk to the mother, and the result will certainly be, as indeed has already been the case, the sacrifice of a certain number of mothers' lives for the sake of their unborn children. The treatment of a case of placenta prævia by version or the introduction of a bag calls for more skill and experience than its treatment by abdominal section, and it would seem as if many of the younger obstetricians were resorting to such operations as an easy solution of their difficulties without weighing sufficiently carefully the resultant dangers to the mothers. Unless the maternal mortality can be brought down to a level equal to that obtained by the ordinary methods, which is certainly not the case at the present time, then it must remain a procedure only to be practised in exceptional cases and in perfectly suitable conditions. No case of placenta prævia should ever be delivered outside a lying-in hospital or nursing home, and, as the figures I have quoted show, in such surroundings the older methods of treatment are very satisfactory as regards the mothers, and until some mode of treatment with no greater danger to the mother is available they should continue to be the selected means of treating these cases, even although they are associated with so large a fœtal death-rate.

The performance of Cæsarean section in the treatment of a case of eclampsia raises a question of very great interest, and one which has given rise to a great deal of discussion. In the series of 4,197 cases there are 196 in which Cæsarean section was performed for eclampsia, with 63 maternal deaths, or a mortality of 31.8 per cent., accompanied by a fœtal mortality of 32 per cent. It is obvious therfore that this method of treatment is being largely practised, and that the maternal death-rate is very high. It may be argued that the operation was done only in the worst class of case when other treatment had failed, and a careful analysis of the cases may show that this is so.

In considering the treatment of this complication of pregnancy and labour it is necessary to start with the assumption that eclampsia is a preventible disease, and its proper treatment is therefore prevention and not cure. With modern methods of investigating and recognizing the exact condition of the kidneys in cases of the toxæmia of pregnancy, the probability of the onset of eclamptic

convulsions can be foreseen and guarded against, and the disease will become rarer and rarer as the present day teaching with regard to the care and supervision of pregnant women becomes more widely spread and acted upon.

In the event, however, of eclampsia occurring, is a Cæsarean section a proper method of treating the patient? Whatever view we may take of the ætiology of eclampsia the answer must be that it is not. The results of the expectant treatment of eclampsia are so much better than those obtained by operative interference that there can be no place for the performance of a Cæsarean section in the treatment of the great majority of cases.

At the Rotunda Hospital during the years 1908—1915, 82 cases were treated expectantly, with a death-rate of only 7.3 per cent. Stroganoff [20] has recorded 839 cases, with a maternal mortality of 8.9 per cent., and a fœtal mortality of 22 per cent.; and Lichtenstein [21] has published from Zweifel's clinic 94 cases treated expectantly, with only 5 maternal deaths, or a mortality of 5.3 per cent. Among these was a consecutive series of 74 cases during a period of 16 months, with no maternal deaths. In view of these figures is there anything to be said for Cæsarean section, with a maternal mortality of possibly 30 per cent.?

Eclampsia.

Treated by methods other than Cæsarean Section.

	Cases.	Mat. Mort.	Fœtal Mort.
Rotunda Hospital	82	7·3%	—
Stroganoff	839	8·9%	22%
Lichtenstein	94	5·3%	—

Treated by Cæsarean Section.

	Cases.	Mat. Mort.	Fœtal Mort.
Munro Kerr and Holland...	196	63=31·8%	32%

The operation has been cynically described as a clumsy method of bleeding the patient, and there is a great deal of truth in this description, as modern results show that venesection is a most important and useful factor in the treatment of the disease. It has been suggested that the results will be improved if the operation is performed early, and no doubt this is so, indeed the same holds good of all methods of treating eclampsia, the earlier the patient comes under treatment the better the results. Lichtenstein's figures show this very clearly, and they are extremely interesting inasmuch as they include 34 cases in which the fits ceased before the onset of labour, and in 21 of these living children were subsequently born.

Fromme [22] has recorded a series of 58 cases treated by vaginal or abdominal Cæsarean section in which the results are classified

according to the number of fits which had occurred before treatment was instituted. In his series 46 were operated upon after 1—5 fits had occurred, and of these 4, or 8.7 per cent., died; while of Lichtenstein's cases, 60 came under treatment under the same conditions, that is to say, after the occurrence of 1—5 fits, and of these only one died, or a mortality of 1.7 per cent. If Cæsarean section then is to become the routine early treatment of eclampsia the results obtained must be compared with those results, and when we remember that the minimal mortality of Cæsarean section practised upon healthy women is 1.5—2 per cent., it is impossible to believe that its performance, even early, in the case of women suffering from so dangerous a condition as eclampsia, is likely to yield results at all comparable with those obtained by the early institution of expectant treatment.

Cæsarean section for labour complicated by the presence of tumours in the pelvis obstructing delivery is a proper and legitimate procedure. The results should be and are good provided that the condition has been recognized and the patient is operated upon early in labour or before labour has started. There can be no question that in any case of doubt the delivery of the patient by Cæsarean section is the best procedure, and should always be resorted to, and in any cases in which there is definite obstruction it is safer than any attempt to deliver the child by the natural passages even after craniotomy or embryotomy.

It is interesting to note the large number of cases recorded in Munro Kerr and Holland's series in which Cæsarean section has been performed for ovarian cysts complicating labour. This, as Munro Kerr points out, is seldom required; the correct procedure is to eventrate the uterus if necessary, to remove the tumour and then to deliver the child through the natural passages, a method which gives extremely good results, and which should always when possible be done. It has the disadvantage that the operation must be performed at the end of the second stage of labour, but, provided that the patient has been properly safeguarded during her labour, this does not increase the danger.

In severe cases of accidental hæmorrhage, especially in the concealed variety, the performance of a Cæsarean section followed if necessary by hysterectomy, is a well recognized and correct mode of procedure. Whatever treatment is adopted the maternal mortality is bound to be high, and in the worst cases opening the abdomen, and if necessary tying the bleeding vessels, is based on sound and good surgical principles.

A good example of the abuse of Cæsarean section is the fact that in four cases in the series it has been practised for impacted shoulder presentations, with a 50 per cent. maternal and fœtal

mortality. If these were cases of contracted pelvis there is some justification for the operation, but otherwise there is none; a case of this kind should not be allowed to become impacted, and when it does should be and can be treated in a normal pelvis without undue danger by version or decapitation.

Even more unjustifiable are the cases in which the operation has been performed for such conditions as hydramnios, hydrocephalus and varicose veins!

It is obvious, from a study of this series of cases, that there is some ground for the belief that Cæsarean section is being resorted to needlessly, and in a large number of conditions in which it is not really necessary, and the time has come for a protest to be made on behalf of those teachers who still believe that many of these cases can be properly and safely treated by a skilled obstetrician, without resort to abdominal section, and that an operation should not be resorted to, as an easy way out of a difficulty, without due regard being had to the risk inseparable therefrom to the life of the mother, and in the, as they believe, mistaken belief that the life of the child should be considered as of equal value to that of the mother. The best accoucheur will be he who endeavours so far as lies in his power neither to sacrifice the life of the child to that of the mother, nor the life of the mother to that of the child.

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Cæsarean Section in Manchester.

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The work in Manchester on Cæsarean Section during the past two years has revealed such a large and interesting series of cases, that I feel justified in publishing a brief analysis thereof. The results are given in two parts; firstly, a brief analysis of the 648 Cæsarean sections performed in Manchester during the years 1911—1920 inclusive; and, secondly, the subsequent reproductive histories of 190 cases of Cæsarean section 1912—1918 inclusive.

1. *A brief analysis of the 648 Cæsarean Sections performed in Manchester during the years 1911—1920 inclusive.*

The total number of cases in this period was 648, of which 557 were performed for contracted pelvis with 23 deaths, mortality 4.1%; 15 for eclampsia with 10 deaths, mortality 66.6%; 25 for ante-partum hæmorrhage with 7 deaths, mortality 28.0%; 51 for other indications with 10 deaths, mortality 19.6%.

There were 50 deaths in the 648 cases, a total mortality of 7.71% for the ten years, which at first sight seems a very high figure, but this includes all cases, and if we eliminate all except those in which a primary Cæsarean section was performed, the mortality was very low. In those cases in which the operation was performed for eclampsia, ante-partum hæmorrhage, and other indications, the mortality is high; but the patients were usually in a serious state on admission, and often *in extremis* at the time of operation.

It is with the twenty-three deaths in the cases of contracted pelvis that I wish to deal more fully. In the records of these deaths I find twelve are ascribed to general peritonitis, and, of these, nine had repeated examinations before admission and the membranes were ruptured. In four of these cases forceps had been applied at home. Of the three who were admitted without any previous examination, one was suffering from albuminuria, one from chronic bronchitis, and this patient had to have the abdominal wound re-sutured. Of these twelve cases only one had no assignable cause for her infection. The mortality then from general peritonitis in Cæsarean section performed for contracted pelvis in Manchester is 2.1%; but all the twelve cases had been

subjected to repeated vaginal examinations, or attempts at instrumental delivery before admission, or there was some marked cause for their infection except in one case, in which there is no note of any such previous interference, though I strongly suspect that there was such interference, as the case was originally in the charge of a midwife, who called in the doctor, who sent her to St. Mary's Hospital, and presumably examinations were made by both.

Of the remaining eleven cases—

3 died of pneumonia;
2 „ intestinal obstruction;
2 „ embolism;
1 „ chronic bronchitis and cardiac failure; no pyrexia;
1 „ hæmorrhage and shock; forceps before admission; moribund then.
1 „ mitral stenosis; P.M., warty vegetations on the mitral valve;
1 „ exhaustion; forceps before admission.

This shows a mortality percentage of 2%. This includes all cases whether previously examined or not; therefore we are justified in stating that the mortality in clean Cæsarean section cases is considerably under 2%.

The conclusions to be drawn from the Manchester experience are—

1st. That Cæsarean section is performed with very little risk to the mother, save when, as Amand Routh has emphasized, she has been subjected to frequent examinations or attempts at delivery have been made.

2nd. Cæsarean section in eclampsia has been disappointing, only five cases recovering, but in these cases the operation was probably performed too late.

3rd. In ante-partum hæmorrhage the procedure is good, and especially in cases of central placenta prævia in viable primigravidæ.

4th. In tumours obstructing labour Cæsarean section is the best treatment both for the mother and child.

The number of Cæsarean sections performed for contracted pelvis in Manchester is strikingly large, and is due to the great prevalence of rickets. Through the courtesy of Dr. Ashby, of the Manchester Children's Hospital I am able to state that the number of cases of rickets seen in the Out-Patient Clinic of the Children's Hospital is fully 10% of the number seen of all cases, and amounts to at least 1,000 cases a year in girls alone. This helps to explain the frequency with which Cæsarean section for contracted pelvis is performed in Manchetsr.

2. *The subsequent reproductive histories of 190 cases of Cæsarean Section, 1912—1918 inclusive.*

In order to make a correct estimate of the later effects of Cæsarean section on the patient's reproductive career it is necessary to investigate the after-histories of a large number of cases. I interviewed personally, or questioned by letter, a series of patients operated on during the years 1912—1918, excluding of course deaths, cases sterilized, and cases in which the first Cæsarean section was performed previous to 1912. The total number of cases in this period was 243, and I was able to follow up 190. The number of cases in whom no subsequent pregnancy occurred was 96, or 50%; the number of cases who subsequently did become pregnant was 94, or 49%.

The results of the pregnancies were:—

	Cases.
Delivery by natural passage	3
Delivery by repeated Cæsarean sections ...	68
Abortions	13
Pregnant now	21
Rupture of the Cæsarean scar	1

RESULTS.

An analysis of the tables gives the following results:—

A. *No Subsequent Pregnancies.*

Ninety-six of the series have not become pregnant since Cæsarean section, that is a relative sterility of 50.5%. Of these cases 22 took precautions against pregnancy; four were widowed; three died of non-pelvic conditions at a later date; in one case the husband had been on active service since.

This accounts for 30 out of 96 not becoming pregnant. The remaining 66 state they took no precautions, therefore the relative sterility is reduced to 34.7%. Of these cases 43 had no pyrexia; 34 had slight pyrexia, 100° F. and under, for a short period; 12 had moderate pyrexia, 100°—101° F. continued; seven had severe pyrexia, 101° F. continued.

Of the seven severe cases, five did not take precautions against pregnancy; one took precautions against pregnancy; one was widowed.

Thus 53 cases had pyrexia, *i.e.*, 55%.

B. *Patients who Subsequently Became Pregnant.*

1. *Delivery by Natural Passages.*

There were four such cases only, including the case of ruptured scar. Three were cases of slight pelvic contraction. Of these

three, two were delivered naturally—one of one, the other of two living children. The third had craniotomy and Cæsarean section later again. The fourth case, who had Cæsarean section and ovariotomy performed in 1916 for an ovarian cyst obstructing delivery, was allowed to go into labour; the scar ruptured in the second stage, and she died in Hospital in 1919.

Of the four cases in which natural delivery was attempted, one died of rupture of the Cæsarean scar, a mortality of 25%.

2. *Repeated Cæsarean Sections.*

There were 68 cases. In each the indication for Cæsarean section was contracted pelvis, with the following five exceptions:—

	Cases.
For large children	1
„ eclampsia	1
„ fibroid	1
„ recto-vaginal fistula	1
„ overdue pregnancy with excessively large child, a monster	1

Twenty-one cases were allowed to go into labour; 47 were not in labour. There was no case of rupture of the scar. In only one case was silk used.

The number of times Cæsarean section was performed in each case was:—

2 Cæsarean sections in 59 cases.
3 „ „ in 7 „
4 „ „ in 2 „

In their subsequent Cæsarean sections:—

4 cases were in labour.
14 „ „ sterilized.
5 „ are pregnant now.

Presumably of these 68 cases, the 63 cases of pelvic contraction would not be suitable for delivery *per vias naturales*, and the five with other indications were, for some reason not discovered by me, not given the opportunity.

With regard to pyrexia in repeated Cæsarean sections:—

24 cases had no pyrexia.
27 „ „ slight pyrexia.
9 „ „ moderate pyrexia.
6 „ „ severe pyrexia.
2 „ doubtful.

So that 44 cases had some degree of pyrexia, *i.e.*, 66%

Six cases of repeated Cæsarean section not included, as they sent no replies, had Cæsarean sections as follows:—

(1) 1912–14–16,
(2) 1913–15,
(3) 1915–16,
(4) 1915–19,
(5) 1916–18,
(6) 1917–20,

and, from the notes, left the Hospital well.

3. *Abortions.*

Thirteen of the cases had abortions, that is 6.8%. The particulars supplied were very scanty. Two stated that they took precautions against pregnancy, and three of the cases were pregnant at the time of writing.

The Case of Rupture of the Cæsarean Scar.

M.S., 2-Para. Age 23. Register No. 570, 1916.

This patient was admitted to the Hospital on November 24th, 1916, suffering from an ovarian cyst obstructing labour. Dr. Fletcher Shaw performed Cæsarean section and right ovariotomy.

Early in 1919 she was seen again by Dr. Shaw in the Out-Patients' Department. She was pregnant, and it was decided to allow her to attempt delivery by natural passages, as there was no pelvic contraction.

May 14, 1919. Patient admitted in labour at 2.40 a.m., and in good condition.

May 14, 5 a.m. Some very strong pains and slight bleeding from the vagina.

May 14, 8.15 a.m. At this time she had a running pulse of 140, and her temperature was subnormal. On abdominal palpation it was obvious that the uterus was ruptured, and she was immediately taken to the theatre and the abdomen opened.

The child was lying free in the peritoneal cavity and was dead. The uterus was inverted through the old scar, which had ruptured, and the placenta was adherent to the inverted uterus. The peritoneal cavity was full of blood. The child and placenta were rapidly removed, the inversion corrected and supra-vaginal hysterectomy performed as quickly as possible. The patient left the table in a very critical condition. She was given salines and stimulants, and rallied a little, but died at 7 p.m. from collapse and shock.

Conclusions.

A. *Relative Sterility after Cæsarean Section.*

This is 34.7% in this series of cases after deducting cases with an apparent reason for their sterility.

Fifty-five per cent. had some degree of pyrexia, which would seem to point to pyrexia, possibly associated with adhesion-formation, having an influence in causing sterility. It is noticeable, however, that in the repeated Cæsarean sections 66% had pyrexia, so that I think precaution against pregnancy is the more likely factor; furthermore it is only fair to remark that included in the 66 cases who are put down as "no precautions" are many who evaded answering this question at all.

B. *Cases Pregnant Now.*

There are 21 of these. The only comment to be made is that several of these cases show an interval from child-bearing which corresponds with an interval of absence of the husband on active service.

C. *Abortions do not seem to follow Cæsarean Section with any marked frequency.*

D. *Delivery by Natural Passages after Cæsarean Section.*

My feeling is that no definite conclusion as to the safety of allowing a post-Cæsarean uterus to be subjected to the strain of labour, can be drawn from these statistics of St. Mary's Hospitals, Manchester.

Only four cases were allowed to attempt delivery *per vias naturales*, and of these one ruptured her scar and died.

I can only state the fact that in this series of four cases our ruptured Cæsarean scars are 25%, and our mortality 25%.

I think, however, that a scar in any part of the body, as a puncture repair is a weak spot in a pneumatic tyre, is liable to give way under strain, and it would appear doubtful to me if it is ever good practice to subject a scar in an organ, so liable as is the uterus to excessive distension and powerful contraction, to the strain of labour.

I do not intend to discuss the question of suture material, but simply state that, with perhaps half a dozen exceptions, two layers of catgut, sometimes chromicised, have been used in all the cases in this series.

I think I may fairly say that what the figures of the St. Mary's Hospitals, Manchester, do show is that repeated Cæsarean sections may be undertaken many times with impunity, and the risk in the early stages of labour appears negligible.

Cæsarean Section in the Treatment of Placenta Prævia.

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To Lawson Tait must be accorded the credit of first suggesting the application of the Cæsarean operation for the relief of placenta prævia. The suggestion at the time received but little support, but served to initiate a discussion which has continued with varying intermissions until the present day. With the passing of the years and the perfecting of the technique of Cæsarean section, the trend of opinion has undergone a change, as regards the indications for the operation, and in no instance has this been more marked than in the case of placenta prævia. In the light of recent discussions it is very interesting to turn to the expressions of opinion ten or twelve years ago, when very definite statements were made on the subject. Henry Jellett, for example, in a paper read before the Obstetrical and Gynæcological Section of the Royal Society of Medicine on August 14th 1910, said that with regard to reducing the maternal mortality "there does not appear to be any place for Cæsarean section in the modern treatment of uncomplicated cases of placenta prævia." Also, concerning the reduction of fœtal mortality, Jellett thought that "the results were disappointing." This opinion was based upon his "Rotunda" experience, and also upon views expressed by Harrison, Jewett, Fry, Newell, and Grandin at the April meeting of the American Gynæcological Society in 1909. In 1910, Krönig and Selheim (*Berl. Med. Wochenschr.*, 1910, xlvii, p. 7) published "26 cases of placenta prævia treated by Cæsarean section, all the mothers recovering and all the children being born alive." The tendency at the London meeting in 1910, however, was to discount the Krönig figures, and to regard the cases as "picked."

Little of importance on the subject was published subsequently until 1920 when a discussion upon the treatment of ante-partum hæmorrhage was held at the Royal Society of Medicine, at a combined meeting of the Section of Obstetrics and Gynæcology, North of England and Midland Obstetrical and Gynæcological Societies. It was evident that a distinct change of opinion had occurred during the intervening ten years. During this time the Cæsarean operation had been developed, and its possibilities, risks

and dangers defined, chiefly as the result of Amand Routh's important publication in 1910.

The majority of the speakers at the 1920 discussion, all practising obstetricians, and representing the chief teaching centres in the country, instead of condemning Cæsarean section for placenta prævia, considered that it occupied a definite place in its treatment, and some were whole-heartedly in favour of it as a routine method of treatment. This opinion was recently confirmed at the 1921 meeting of the British Medical Association in Newcastle, when Munro Kerr and Eardley Holland opened a discussion upon the "Indications for Cæsarean Section." Interest in the question is not confined to this country, as is shown by the publications in the Continental and American Medical Press during the past year. Papers have appeared by Gonzàles, Guèniot, Râmos and Perez, Moran and others, all showing most favourable results both to mother and child from the application of the Cæsarean operation to placenta prævia.

Now that the operation has apparently proved its value in dealing successfully with certain cases of this obstetric complication, it will be of interest during the ensuing years to note whether it is able to maintain its position. To do this it must conform to three postulates:—

1. The existing maternal mortality from older methods of treatment must not be raised.
2. The subsequent maternal *morbidity* must not be increased.
3. The fœtal mortality must be appreciably lowered.

That there is room for considerable improvement in the older methods of treatment of placenta prævia is evident from a consideration of the results of institutional treatment over a number of years. When discussing the right or wrong of any method of treatment involving operative procedure it is impossible to eliminate the personal equation. The same method may be attended by very different results in the hands of two individuals. Further, it is well known how, from time to time, various methods are advocated as being the ideal by certain enthusiasts, which further experience proves to be but an abnormal run of luck. In order to arrive therefore at the unvarnished facts, recourse must be had to the published reports of public institutions of which the staffs are constantly changing, and in which an individual's work forms but a part of the whole. From a critical survey of the facts and figures contained therein, it is possible, without bias or prejudice, to arrive at certain conclusions.

For the purpose of forming an opinion upon the relative influence of certain obstetric operations upon fœtal mortality, the

writer of this review recently examined the Annual Reports of the Birmingham Maternity Hospital over a period covering the last ten years. The results of the investigation are published *in extenso* in the Report of the Royal Sanitary Congress held in Birmingham in 1920.

During this investigation the high maternal and fœtal mortality for placenta prævia became at once evident. In the period under review, 317 cases of this complication were admitted to the hospital, out of a total of 5,591 admissions, *i.e.*, a percentage of 5.6. Of these, 18 mothers died, a mortality of 5.6. Of the babies, 212 were stillborn, and 33 more died in hospital, a gross fœtal mortality of 77.2 per cent.

During these ten years, eleven methods of delivery have been practised in the Institution, with the results shown in the appended table.

TABLE I.

SHOWING METHODS OF DELIVERY IN PLACENTA PRÆVIA.

Method.	Cases.	Fœtal Death.	Percentage.	Maternal Death	Percentage.
Version	211	193	91.4	9	4.2
Natural	35	16	45.7	0	0
De Ribes' Bag	15	11	73.3	3	20.0
Rupture of Membranes ...	11	9	81.8	0	0
Forceps	9	9	100.0	2	22.0
Cæsarean Section ...	5	2	40.0	3	60.0
Vaginal Cæsarean Section	4	2	50.0	0	0
Induction	2	1	50.0	0	0
Extraction of Breech ...	2	1	50.0	0	0
Vaginal Pack	1	0	0	0	0
Hysterectomy	1	1	100.0	1	100.0

The favourite method of treatment was the time-honoured one of version. It is interesting to note, however, that in 211 women delivered by this means, the maternal death-rate was 4.2 per cent., and the fœtal death-rate 91.4 per cent. The maternal deaths were in part due to hæmorrhage and in part to sepsis.

If delivery could be left to nature, and by that it is presumed that the degree of hæmorrhage was not so severe as to call for immediate action, it is recorded that of a total of 35 cases, the maternal deaths were nil. The fœtal deaths registered 16, a percentage of 45.7. Improvement in the fœtal mortality is due partly to the lesser amount of hæmorrhage, and partly to the fact that the risk of breech presentation is not super-added to that of ante-

partum bleeding. In other words, the cases which may be left to nature are the minor degrees of lateral or marginal insertion of the placenta, and here one would naturally expect a lessened mortality, both maternal and fœtal.

The application of De Ribes' Bag in 15 cases was associated with a maternal mortality of 20 per cent., and a fœtal death-rate of 73.3 per cent. There is no doubt in the history of obstetrics that De Ribes' Bag has in the past rendered valuable service, but with the choice of other surgical and more cleanly methods, it appears possible to-day to eliminate the risks attended by its use.

With regard to rupturing the membranes, obviously a method which can only be adopted in marginal or lateral cases, the maternal mortality is low, as is to be expected. Of 11 cases in which this was the method employed, all the mothers recovered. Unfortunately, however, 9 of the 11 babies were stillborn, a fact which mars the total result, and points to a too late diagnosis and treatment.

As to forceps, only 9 cases of placenta prævia were treated by this method of delivery in ten years, but these nine cases accounted for the death of two mothers and the whole of the children. Forceps delivery in the presence of this complication is evidently highly dangerous to mother and child alike.

The five methods noted cover those most frequently in use in institutional practice in Birmingham during the last ten years, as shown by the published reports. Of a total of 281 cases of placenta prævia so treated, 238 babies died and 14 mothers, percentages respectively of 84.7 per cent. and 4.9 per cent.

Further, since placenta prævia accounted for 31.3 per cent. of the total number of still-births occurring in the Birmingham Maternity Hospital during the period under consideration, figures reaching 715, the problem of treatment is one of considerable importance.

In order to lower appreciably the existing mortality rates, early diagnosis of this complication is the first step. Every case of ante-partum hæmorrhage is not necessarily due to placenta prævia, but every case of ante-partum hæmorrhage calls for the most careful pelvic examination.

When the placenta has a low insertion, the lower uterine segment in nine cases out of ten presents a different consistence from the normal. It does not possess that degree of elasticity which the normal uterine wall presents, and this fact has been found a useful diagnostic sign.

Further, if the hæmorrhage has been so severe as to fill the lower uterine segment with clot, which may resemble placental tissue to the examining finger, the diagnosis is not of so great

moment, as the life of the fœtus has probably already been sacrificed.

Placenta prævia should be recognized if possible *before* bleeding has been so severe as to interfere with the vitality of the fœtus. The first hæmorrhage is therefore the danger signal and the indication for careful pelvic examination. If this initial hæmorrhage has not been sufficiently severe to affect the vitality of the child, and the pregnancy has advanced to the eighth month, time should not be lost in an endeavour to see what nature will do.

In the reports of the Institution upon which this review is based, a case is recorded of a woman admitted for central placenta prævia, who was delivered by Cæsarean section and who subsequently died. A note is attached to the effect that this woman had been bleeding continuously for ten days before admission. It is little to be wondered at that she died, and the operation cannot be blamed for her death. If the woman had been admitted for treatment upon the *first day* of the bleeding who is to say that she would not have recovered?

In view of the series of cases recently published in which both the maternal and fœtal mortality of Cæsarean section for placenta prævia has been nil, it is evident that the pendulum is swinging more and more in favour of abdominal section as being the ideal method of treatment for this obstetric complication. What is necessary, is to define the limits of the operation in this connection, in other words to establish a standard whereby it is possible to say that the indication is *absolute* in distinction to occasions when it is but *relative* or uncalled for.

It is, for example, unnecessary to propose the Cæsarean operation as a routine when the placenta is but marginal and when it is reasonable to suppose that delivery by other methods will be attended by the best results. It also appears wrong to submit a patient to the risks of abdominal operation when from the severity of the initial hæmorrhage it is to be assumed that there is little possibility of a living child being born. Nothing is to be gained by performing Cæsarean section in such circumstances, and if it is adopted on any and every occasion it will, sooner or later, become discredited.

The writer's practice is to reserve Cæsarean section for those cases of placenta prævia causing symptoms from the eighth month of pregnancy onwards, and when the first hæmorrhage has not been so severe as to risk the vitality of the child. Acting on these indications, 9 cases of central and lateral placenta prævia have been so treated during the past three years by the Cæsarean operation. Two of the cases were examples of binovular twin pregnancy, one placenta being " prævia " and the other situated on the anterior

uterine wall. All the mothers recovered, and 11 living children were born. Nine of the infants were alive and well one month after the operation, 1 infant died a few hours after birth, and one survived the operation only 7 days.

The question is sometimes raised as to the right procedure to adopt when the services of an experienced surgeon are not available. It is possible that cases will arise when the ideal cannot be obtained, and recourse must be had to the older and less satisfactory therapeutic measures. At the same time, with modern facilities of transport and the development of the Cottage Hospital and Nursing Home, it is difficult to imagine that the occasion can be very frequent when skilled help is not at hand. Further, it is surprising what excellent results *can* be obtained under stress of circumstances, even in a cottage or slum, when it is impossible to transport the patient to hospital, if only ordinary surgical cleanliness is observed.

The Lower Uterine Segment Incision in Conservative Cæsarean Section.

By Professor J. M. Munro Kerr, M.D.

By the term "conservative Cæsarean section" is meant the non-sterilization of the patient following upon the extraction of the child and the suturing of the uterus.

I feel I am voicing the opinion of all enlightened obstetricians in this and other countries when I say that our desire is to perform the conservative operation and not to sterilize the patient. We feel that sterilization of the patient after Cæsarean section unless there is some definite disease of uterus, heart, lungs, etc., or mental weakness, is a crude procedure and will only be justifiable in the future if it is proved beyond doubt that it is not possible to secure a sound uterine cicatrix. If such a decision is forced upon us it will be most unfortunate, for it will undoubtedly compel us to limit the scope of Cæsarean section and preclude us from extending the operation to many obstetrical complications which we feel could undoubtedly be more suitably dealt with by Cæsarean section than by the ordinary methods of treatment at present employed. It is unnecessary to enter into details regarding such conditions, for the indications for Cæsarean section were freely considered at the recent meeting of the British Medical Association in Newcastle.

The purpose of the present paper is to discuss the relative merits of the ordinary longitudinal incision through the body of the uterus, and the incision through the "lower uterine segment." With this object let us consider the subject under the following heads:—

(1) The evidence that the uterine scar in conservative Cæsarean section is frequently unsatisfactory.
(2) The reasons why the uterine scar is so frequently defective.
(3) The means by which a better scar can be secured with the ordinary longitudinal incision.
(4) The lower uterine incision which, in my opinion, is preferable to the ordinary longitudinal incision as I believe it gives a sounder cicatrix.

(1) *The evidence that the uterine scar in Cæsarean section is frequently unsatisfactory.* This question has been gone into very fully by Eardley Holland. The results of his inquiries and inves-

tigations will be referred to later. As regards the Glasgow Maternity Hospital, Drs. Hewitt and Lindsay found in their investigations over the years 1912—1919 inclusive that the liability to rupture was present in 5 per cent. of cases, and that rupture occurred in 1.8 per cent.

Practically all writers have been forced to the conclusion that in a fair percentage of cases the uterine scar is not satisfactory. Take, for example, the most important contribution made by Couvelaire. This author in his most excellent work, "Introduction à la Chirurgie Uterine Obstetricale," states on p. 141 that in 17 per cent. of cases there is an unsatisfactory cicatrix, in 10 per cent. extreme thinning of the cicatrix, and in 2 per cent. rupture of the uterus. Losee,[1] McPherson,[2] and Findlay[3] give somewhat similar experiences.

Let us turn now to the figures of Eardley Holland.[4] They are the most exact data at our disposal. He organized, early in 1920, amongst a large number of obstetric surgeons in Great Britain and Ireland, a "follow-up" inquiry into the subsequent obstetrical history of hospital patients who had had Cæsarean section performed between the years 1912 and 1918 inclusive. He summarizes his results in the following table:—

Total number of Cæsarean section patients (excluding fatal and sterilized cases, and cases of repeated Cæsarean section where the first operation was performed prior to 1912)	1,605
Number followed up	1,103
Number in whom no subsequent pregnancy occurred ...	616
Number who subsequently became pregnant...	487
Results of pregnancies:—	
Delivery by natural passages	78
Repeated Cæsarean section	352
Abortion	47
Pregnant now	86
Rupture of scar	18

These figures show that the frequency of rupture of the scar in subsequent pregnancy or labour (cases of abortion and early pregnancy excluded) is 18 in 448, or 4 per cent.; also, that the proportion of ruptured scars to cases of delivery by the natural passages is 18 to 740, or 1 to 4.3 per cent. We may safely, therefore, take it that at the present time there is definite evidence to prove that the uterine scar after the conservative Cæsarean section is not as sound a scar as is generally supposed, and that it frequently gives way completely or partially.

(2) *The reasons why the Uterine Scar is so frequently defective.* For many years I have been particularly interested in this subject, and have incidentally referred to it on several occasions when writing on Cæsarean section. In my last contribution, a chapter on Surgical Operations of the Gravid Uterus in "The New System of Gynæcology,"[5] I referred to the matter briefly. At the time the Editors were inclined to think that my remarks relative to the unsatisfactory Cæsarean scar too pessimistic. Personally, I do not think so, and the figures referred to above only confirm my previous impressions.

If a general surgeon were asked his opinion why the Cæsarean section wound is unsatisfactory in a number of cases, he would almost certanly give the answer that it was due to faulty technique, for he would have in his mind the excisions and repairs he is accustomed to make on the abdominal organs. As a matter of fact, I have tested one or two surgeons on the point and have received the answer expected. I beg, however, to differ from them, and to offer the opinion that the process of healing in the uterine wound is liable to certain disturbing factors which do not prevail in wounds elsewhere.

The first of these is the difficulty in securing complete asepsis. Now this is specially difficult to secure in the uterine wound, because of the danger of a spread upwards from the vagina. If the uterine wound in Cæsarean section becomes directly infected through the abdominal opening the surgical team is to blame. The surgeon and his team should be able to prevent such an occurrence. But owing to the fact that Cæsarean section has often to be performed with the patient imperfectly prepared vaginally, and upon a structure so easily infected, it is not to be wondered at that even in the hands of the most careful and experienced operators infection of uterus from below cannot always be prevented.

Another very important factor which militates against an absolutely normal healing in the uterine wound is the *fact that the uterine muscle fibres during the puerperium* are in a state of degeneration. An autolysis occurs in the muscle fibres. It stands to reason, therefore, that the healing process must be interfered with in the early days of the puerperium as a result of this degeneration.

A third disturbing factor is the fact that the sheets of muscle which form the uterine wall are irregularly distributed, and this is seen very markedly in Cæsarean section whenever the uterus begins to retract. The surface of the wound, then, instead of being smooth, becomes irregular and puckered, and no matter how carefully the surgeon stretches the wound it is difficult to prevent

the occurrence of small pockets when he brings the surfaces of the wound together.

A fourth disturbing factor is the state of unrest of the uterus subsequent to operation. Not only does the uterus "retract," but from time to time it "contracts." If the uterus contracts before the sutures are inserted it will be observed that the edges and surfaces of the wound gape; while if the sutures are tied they appear strained when the uterus contracts. This alternate contraction and relaxation of the uterus, therefore disturbs the coaptation and lessens the hold the stitches have on the tissues, and so favours the occurrence of small collections of blood between the coapted surfaces.

A fifth and very important factor is the necessity imposed upon the surgeon of using his ligatures not only as coaptors but as hæmostatic agents. For the ideal healing of a wound, next to asepsis comes complete hæmostasis. The general surgeon secures this by picking up bleeding vessels and if necessary applying ligatures to them. The obstetric surgeon cannot do this. He has to apply his sutures firmly if he wishes to stop bleeding and prevent the effusion of a certain amount of blood between the cut surfaces of the uterine wound. I shall refer to this matter later, under Head 3.

There is yet another disturbing factor. If the placenta is situated on the anterior wall, and this, as I have shown elsewhere,[6] occurs in 40 per cent. of cases, the operator will find that he has a layer of tissue peculiarly difficult to stitch and coapt exactly. It is very spongy, very friable, and contains large vessels, and no matter how carefully he applies his sutures blood collects between the edges and there is a tendency for a gutter to form along the internal line of the wound. Into this gutter at the subsequent pregnancy the membranes protude and a hernia gradually develops, and this is the is the ordinary method of rupture.

I maintain, therefore, that there are very decided factors which militate against an absolutely sound uterine cicatrix. If these old uterine cicatrices are examined microscopically it will be found that in a considerable number of them there is a relatively greater portion of fibrous tissue, even when the wound heals satisfactorily. I have proved this to be the case in several instances, and have microscopic specimens which support the views expressed.

(3) *The means by which a better scar can be secured with the ordinary longitudinal incision.* The first detail is the prevention of infection. Undoubtedly it would be of tremendous advantage if we could always have patients resident in hospital and carefully prepared some time beforehand. Without doubt, now that antenatal cliniques have been established and the prospective mother

is being looked after, matters will improve, and patients requiring Cæsarean section will not be rushed into hospital or nursing home at the last minute, and so the preparations for operation will be leisurely and thoroughly carried out.

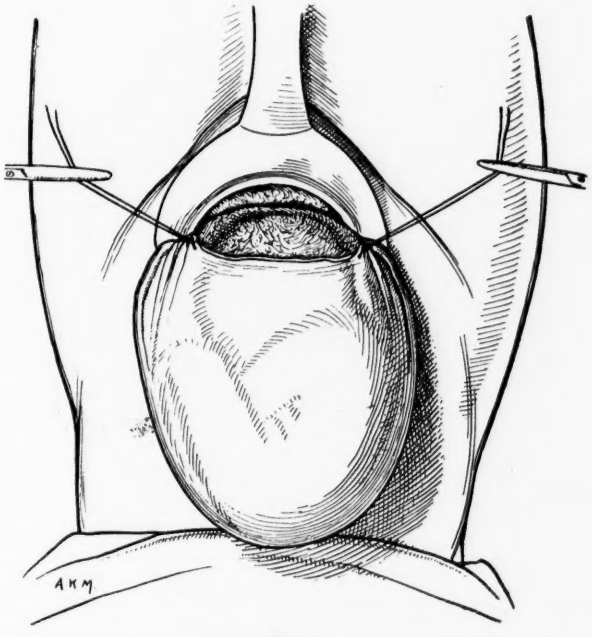

FIG. 1.

The patient is in the Trendelenburg position. A retractor is shown in lower angle of wound. Bladder seen retracted. Two sutures have been applied at the side of the incision. Lower segment seen exposed.

Some years ago I advocated the delivery of the placenta by the vagina after Cæsarean section, especially in cases where there was a possible infection of the vagina. I am convinced that the uterine wound is frequently infected by dragging the placenta and membranes up through it. Naturally this procedure of forcing it downwards into the vagina, as occurs in normal labour, can only be employed when the cervix is well dilated, and this raises the question of the time when Cæsarean section should be performed.

As regards Cæsarean section performed for pelvic deformity, the commonest indication for the operation, the ideal time to operate is when the os is fairly well dilated. But when the obstruction is from fibroid tumours, and when hysterectomy is probably necessary, it is better to operate in the last few days of the pregnancy before labour has actually started, for then the cervix is

undilated and the stump of the cervix or vagina can be more easily stitched over. In cases in which the operation has to be performed for grave complications of pregnancy, such as eclampsia, one has naturally no choice of the time, one must deal with the condition whenever it is thought necessary to empty the uterus by this procedure.

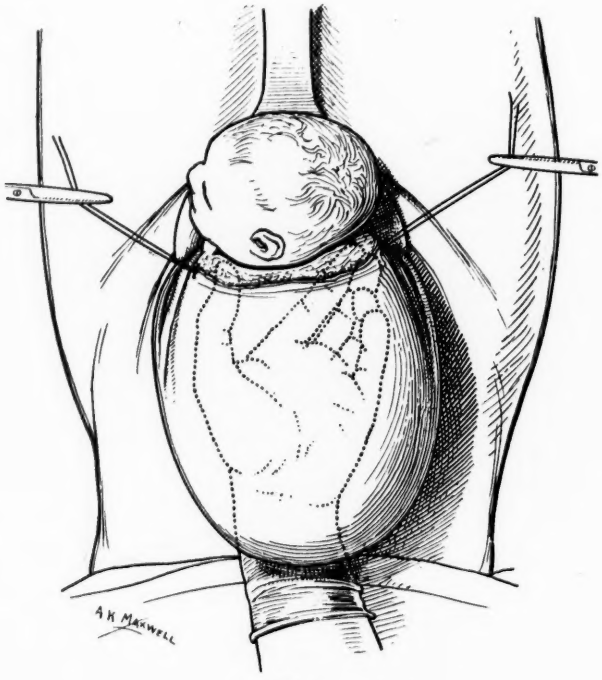

FIG. 2.

Lower segment has been incised transversely. Operator's left hand is shown passed behind uterus and expressing child's head through wound.

Another very important question is whether the uterine wound should be stitched in layers or with through and through sutures. The general feeling at the present time seems to be that it is better to stitch in layers, and this is the procedure I have been following for some years. Very important also is the material used for suture. For many years I used nothing but catgut, and I am inclined to think that in some of my cases in which there was a weak cicatrix the suture material was to blame, not because of the danger of asepsis—with carefully prepared catgut that danger can be excluded nowadays—but because the catgut yields too much and does not keep the surfaces of the uterus coapted. In recent

years I have been stitching the under layer with catgut, but the bulk of the muscle tissue with linen thread or fine silk. Eardley Holland's figures in this connection are most interesting.

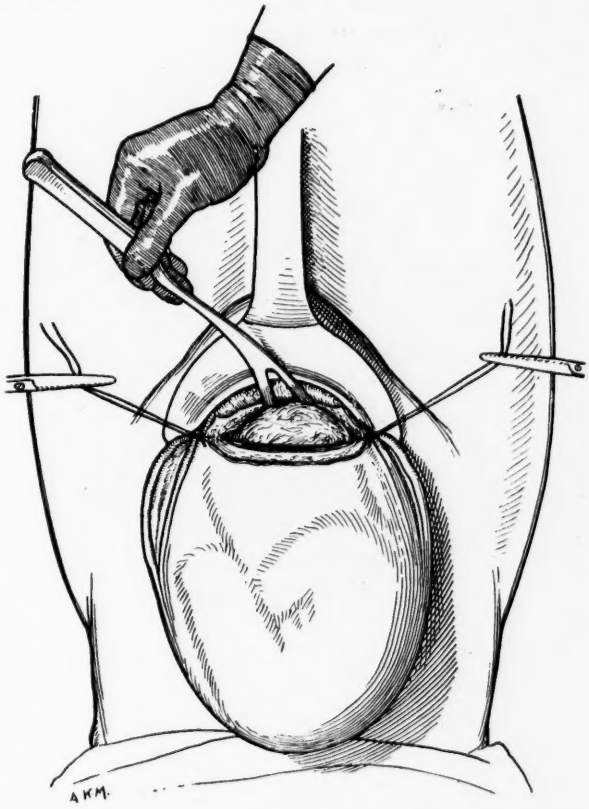

FIG. 3.

One blade of the forceps is shown under the head of the child. If the fundus is compressed the child's head will readily slip through wound.

Another very important point is to suture the uterus while it is in a state of retraction as distinguished from that of contraction. Now one usually gets ten mintues or a quarter of an hour after the child is delivered when there is comparatively little placental separation, and very frequently only slight uterine contraction. With the uterus in this passive state one can stitch it more easily and coapt the surfaces more accurately. This is a strong argument in favour of leaving the placenta to separate naturally and be expelled per vaginam. But even if the placenta is removed through the wound it is a great mistake to manipulate the uterus

manually, or to give, as some operators do, an intramuscular injection of ergot or pituitary extract. For this causes gaping of the uterine wound and renders the coaptation of the edges more difficult. If the uterine wound bleeds too freely this can be controlled by temporarily clamping the uterine and ovarian vessels, or by the assistant grasping the broad ligaments.

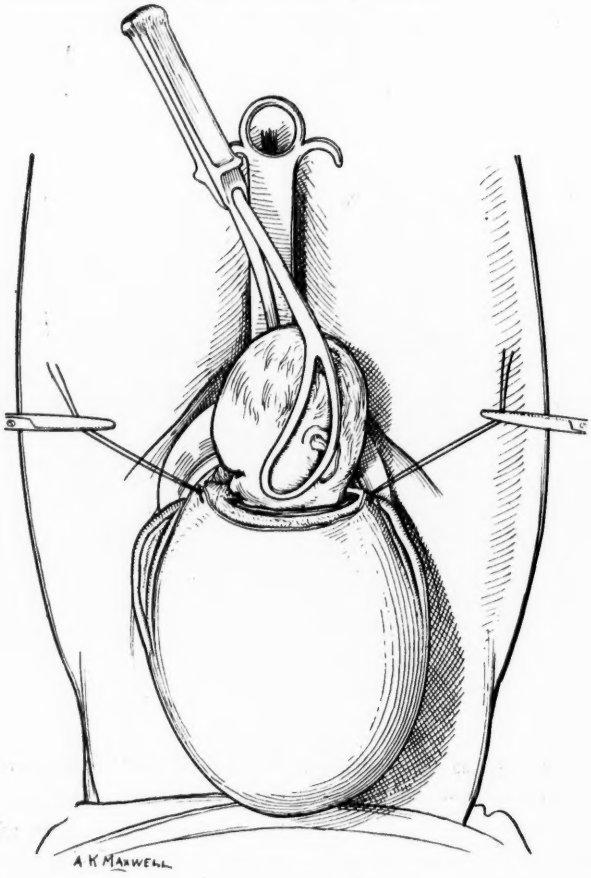

FIG. 4.

In cases in which there is special difficulty in extracting the head, the forceps may be employed as shown here. Author has found it necessary only once in 22 cases.

(4) *The lower uterine incision which, in my opinion, is preferable to the ordinary longitudinal incision, as I believe it gives a sounder cicatrix.* Incisions in the lower uterine segment have been discussed in considerable detail in French and German obstetric

journals in recent years by many distinguished obstetricians, such as Frank, Döderlein, Sellheic, Pfannenstiel, Kustner, Latzko, Jennin. Various names have been given to the incisions, such as the "suprasymphyseal," "extraperitoneal," "subperitoneal," Cæsarean section. In this country the one which has been most discussed is that recommended by Döderlein, which is really, however, a modification of Latzko's incision. It and its variations are the only genuine extraperitoneal incisions. The others are not really extraperitoneal, for the incision is only made extraperitoneal after the parietal and visceral layers of peritoneum have been stitched together.

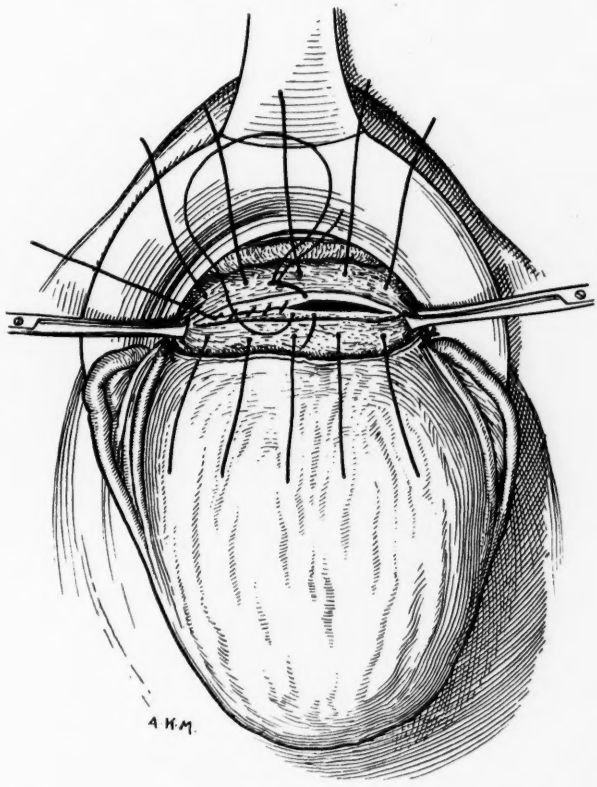

FIG. 5.

Child has been extracted, and the placenta has been removed manually or left to be expelled through the cervical canal. Layers of sutures are here shown—continuous catgut for mucous membrane, linen thread for muscular tissue. Wound is shown here held up by volsellum forceps, but in practice, I usually employ the ligatures shown in previous figures.

As a matter of fact extraperitoneal incisions go back even further than the present century, for Ritgen and others in the early part and Thomas in the later part of last century described extra-peritoneal operations.

One thing, however, has been common to all of the various operations on the lower segment, viz., they have been advocated as being safer in presumably infected cases.

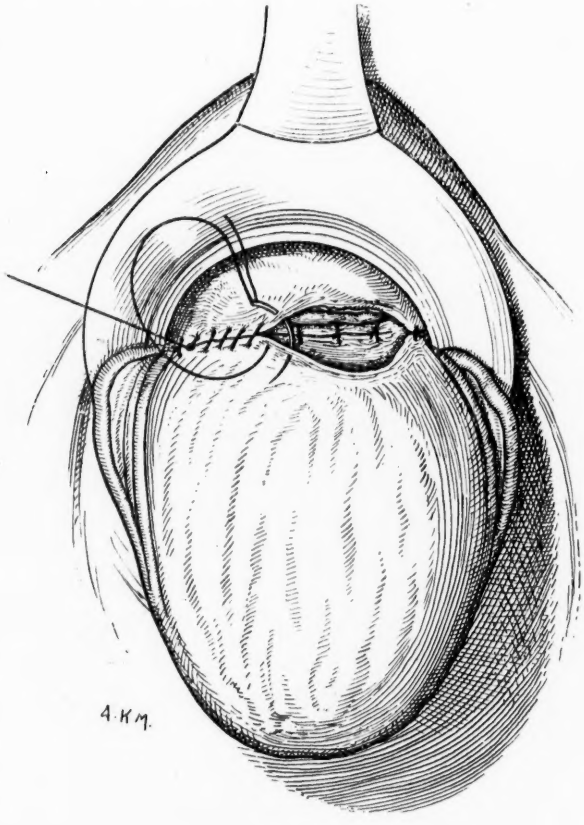

FIG. 6.

The muscular tissue of the uterus is shown united with ligatures tied and coapted A continuous suture is being applied to unite the two flaps of peritoneum.

Now, I wish it to be clearly understood that in the present paper I am not advocating the lower uterine incision on such grounds, but because I believe the cicatrix formed is sounder and stronger than the cicatrix in any other part of the uterus. I have therefore in the last three years experimented on this incision and employed

it on twenty-two occasions. Before discussing its value let me describe briefly the method I have employed. The patient is prepared for operation in the ordinary way, and the vulva, vagina, and cervix are carefully disinfected. She is then placed in the Trendelenburg position. A longitudinal incision is made, reaching from below the umbilicus as far as the symphysis. After the abdomen is opened the bladder is dissected off the anterior uterine wall. A transverse incision is made in the lower uterine segment. (Fig. 1.) A suture is inserted at each end of the wound; this is employed to control any laceration at the ends of the wound and after delivery to pull up the wound so that it can be easily stitched. The child is then expressed by passing a hand behind the uterus (Fig. 2). Where this is not possible and the uterus has not been turned out of the abdomen, one blade of the forceps used as a vectis may be employed. (Fig. 3.) Only once have I employed the two blades of the forceps. (Fig. 4.) The child having been extracted and the cord tied, the placenta may be removed through the wound if the cervix is not sufficiently dilated, but if the cervix is sufficiently dilated I drop the cord into the uterine cavity and deliver the placenta by the vagina. I then pull up the wound so that it is within easy access for stitching by means of the two lateral stitches already referred to. I insert three layers of *sutures* (Fig. 5), catgut for the mucous membrane, linen thread for muscle, and a third layer of catgut for tucking back the bladder into its old position. (Fig. 6.) I generally find that it is an advantage to insert a large retractor in the lower part of the abdominal wall so that the lower segment is within easy access. Sometimes the operation is a little more difficult than the ordinary one, but recently I have found it quite as simple.

I make no claims to originality as regards the incision, and I recommend it only because I believe that the cicatrix that results will be less liable to rupture. The advantages of the incision are that one cuts through a less vascular area; the bleeding is extraordinarily slight unless the wound is allowed to extend into the vessels at the side. In the second place, it is thin and consequently the surfaces can be readily brought together. In one case where I removed a strip of tissue I found the transverse fibres were much greater than the longitudinal ones, but I cannot be dogmatic on this point. The third advantage, and it is a very important one, is that the wound in this area is at rest during the early days of the puerperium. (Fig. 7.) Lastly, there is this great advantage that owing to the fact that the lower uterine segment does not become fully stretched until labour is well advanced the scar is in a safer region than the ordinary longitudinal one.

As already stated, I have performed the operation on twenty-two

occasions with one fatality. To my knowledge there has been one case of spontaneous delivery after the operation, and on four occasions a second Cæsarean section has been performed. In two of these cases my assistant examined the scar very carefully indeed, and could find practically no trace of the former wound. My senior assistant (Dr. Hendry) and Dr. Shannon both report very favourably of the incision.

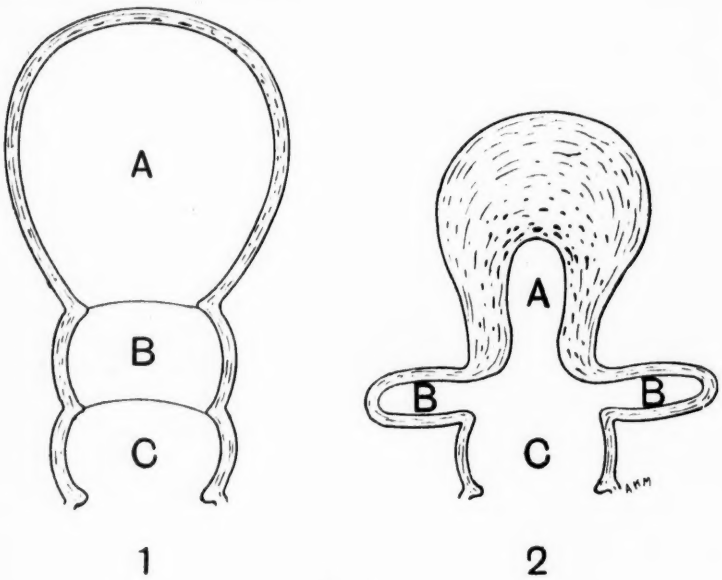

FIG. 7.

Diagram to illustrate the appearance of lower uterine segment when labour is advanced, and after delivery.

1. The three areas of uterus are indicated: A. active contractile portion; B. lower uterine segment; C. cervix.
2. The appearance presented by lower segment twenty-four hours after delivery. This can be confirmed by the illustrations of frozen sections of puerperal uterus.

But, like every other surgical procedure, the lower uterine segment incision has its limitations and disadvantages. It is an operation particularly suited for the case in which labour is well advanced in the second stage, and where the lower uterine segment is thin. On the last occasion on which I performed the operation, some three weeks ago, the patient had reached term, but labour had not started. The wall of the uterus was much thicker and the lower segment more difficult to reach. But even in such cases, viz., cases in which labour has not started, if the uterus is turned

out of the abdomen, the patient placed in the Trendelenburg position, and a retractor used to pull down the lower angle of the wound I believe the incision preferable to the ordinary longitudinal one.

Some of my colleagues, *e.g.*, Blair Bell, have referred to the danger of excessive hæmorrhage owing to great varicosity of the veins or the presence of placenta prævia, but anyone who has had experience of a number of Cæsarean sections knows that even in the longitudinal incision bleeding is often excessive, and the placenta is encountered in 40 per cent. of cases.

There was, however, one case in which I found it impossible to deliver the child through the incision. It was a case of contraction at the outlet. The waters had drained away, and the head of the child lay transversely at the pelvic outlet. I made the incision, but could not raise the head out of the pelvis. I had therefore to extend the incision longitudinally. This extension of the incision longitudinally leads me to say a word regarding the longitudinal incision over the uterine segment rather than the transverse one which I employ. This has been recommended by several operators in the past, and more especially by Eardley Holland recently. I see no objections to the longitudinal incision as far as I can judge at present, but I am inclined to think that the transverse one is preferable. The selection of the most suitable direction of the incision will be decided when we know how the muscular fibres of the lower uterine segment are distributed. In a specimen which I examined microscopically the largest portion of the fibres ran circularly. From the development of the uterus I should imagine that this would prove to be the case.

Undoubtedly the operation is a little more complicated than the ordinary longitudinal one, and it is not so suitable for emergency Cæsarean section in domestic practice.

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Rupture of the Cæsarean Section Scar in Subsequent Pregnancy or Labour.[1]

By Eardley Holland, M.D., F.R.C.P. (Lond.), F.R.C.S. (Eng.).

My interest in this subject has been excited by the following series of events in the obstetrical department of the London Hospital. In November last I operated on a patient almost moribund from the effects of rupture of the scar of a Cæsarean section performed in 1915; in February of this year I saw in the postmortem room a patient dead from abdominal sepsis consequent on rupture of the scar of a Cæsarean section I had myself performed in 1916, and in the years 1915 and 1916 three other of our Cæsarean section patients got rupture of their scars. The occurrence of five of these treacherous accidents in five years has made a very great impression on the minds of myself and my colleagues.

On inquiry into the subject I was impressed with the fact that we possessed very little information about rupture of the scar, either as to its causes, or, far more important, as to the frequency with which it occurred. At the outset I was struck by the wide divergence of opinion amongst the few with whom I talked or corresponded. On the one hand, I was told that rupture of the scar was more or less of a myth; on the other hand, I learned that certain outstanding surgeons, the Camerons, of Glasgow, for example, were so afraid of ruptured scars that their invariable custom was to sterilize their patients at the first operation. Further inquiry proved that rupture of the scar was no myth, but was a real menace; I heard of recent cases in London and elsewhere; about a hundred cases had already been reported in the obstetrical literature of Europe and America. Obviously the subject required investigation. It seemed, above all, imperative to find out what was the actual frequency, the real risk, of rupture. Quite apart from the importance of this information to obstetric surgeons, patients themselves might wish to know what sort of obstetric future they were likely to have after submitting themselves to Cæsarean section. It seemed all the more important to get exact information in view of the increasing frequency with which the operation is being per-

1. Reprinted from *Proc. Roy. Soc. Med.*, 1920, vol. xiv (Obstet. and Gyn. Sect.). The abstracts of the 92 cases reported in literature and the full table of lists of cases in the collective follow-up investigation have not been reprinted here, and the reader is referred for them to the full paper in the *Proc. Roy. Soc. Med.*

formed; the scope of Cæsarean section has been widely extended of recent years, and its modern indications form an ever-growing list. There is another point: many patients who nowadays have had Cæsarean section have nothing to prevent them, in the event of a future pregnancy, from delivering themselves by the natural passages—a very different thing from the days when pelvic contraction was almost the only indication, when a repeated operation was the only way of future delivery, and when scars were seldom strained by labour.

If, on inquiry, the risk of scar rupture was revealed to be a negligible one, then we could, with clear consciences, go on advising and performing the operation according to its extended indications; but if the risk turned out to be an appreciable one, then we should be forced to seek safety either by limiting the indications or by contriving an operative technique which would give us a more dependable scar.

Impressed with the importance of these considerations, I determined to set about the subject and to arouse the interest and invite the co-operation of as many other obstetric surgeons as I could.

I have divided my paper into three sections:—

(I) An account of five new cases.
(II) An analysis of the literature, a general discussion on the ætiology and anatomy of ruptured scars, and an abstract of the cases hitherto reported.
(III) The results of a follow-up inquiry into the subsequent obstetric history of a large number of Cæsarean section patients, operated on between 1912 and 1918 inclusive.

(I) An Account of Five New Cases.

The details of the five new cases from the London Hospital are as follows:—

Case I.—Reg. No. 1914/41137. Cæsarean section on April 17, 1914, by Dr. Russell Andrews. Primigravida, aged 29; lumbar kyphosis, with extreme contraction of the pelvic outlet. Entered hospital early in labour at term; uterus opened by usual anterior median incision; sutured with two layers of chromic catgut, a deep buried one including the whole thickness of the muscle and missing the endometrium, and a continuous peritoneal suture. Placental site not noted. Living child, weight 6¾ lb. Recovery good; the temperature did not rise above 99.4° F. during the first four days, and afterwards was not above normal.

Readmitted on August 13, 1915, with rupture of the scar. No intervening pregnancy. Last menstrual period, November 11, 1914. Pain began on August 13, 1915, at 2.30 a.m., when she got out of bed to attend to her child, who was screaming; it was a continuous cramping pain which doubled her up and made her vomit and feel faint; it was stated that she

fainted several times. She was admitted at 8 a.m.; anæmic, pulse 120 and of poor volume, temperature 98° F. She was in continuous abdominal pain, the uterus was very tender and hard and the abdominal muscles rigid; the fœtal heart could not be heard; no external hæmorrhage. A diagnosis of concealed accidental hæmorrhage was made. There were no labour pains. Laparotomy by the late Dr. Drummond Maxwell. An ovoid rupture, 1½ in. long, was seen in the upper part of the uterine scar, the rest of which was faintly visible as a linear peritoneal thickening. Placental tissue protruded through the rupture, and blood was oozing from it. There were about 2 pints of blood in the peritoneal cavity. The uterus, with the ovum *in situ*, was removed by subtotal hysterectomy, and the patient made a good recovery.

The specimen is, unfortunately, not available for descriptive purposes.

Case II.—Reg. No. 1914/42248. July 26, 1914. **Primigravida**, aged 19; admitted with eclampsia, in the thirty-eighth week of pregnancy. Before admission had already had five convulsions; between 5 a.m. and 11.30 a.m. had convulsions every half hour; treated with morphia, venesection and intravenous saline infusion. After temporary improvement, the convulsions increased in severity and frequency. At 2.30 p.m. Cæsarean section was performed by Mr. Gordon Luker. Labour had already started. The uterus was opened by the usual anterior median incision. Recently dead fœtus, of 7½ lb. weight, delivered. Incision sutured with two layers of chromic catgut, deep and superficial. Convalescence was febrile; the temperature rose daily to 102° F. for the first four days, for the next five it did not exceed 100° F., on the tenth and eleventh it rose to 103° F.; on the twelfth it fell to 99° F., and remained between 99° F. and normal until the patient was discharged, well, on August 16, 1914. The abdominal wound healed by primary union.

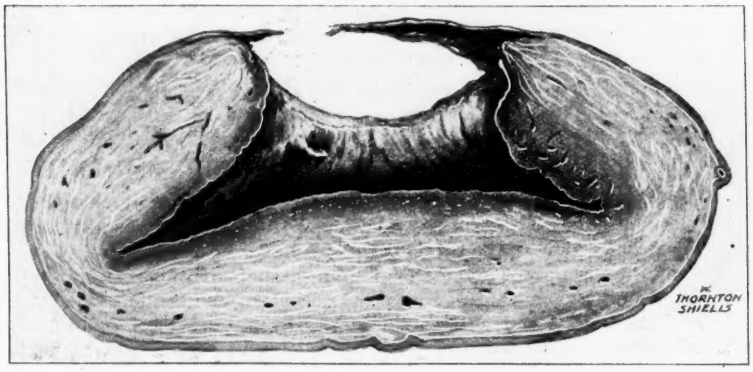

Fig. 1 (Case II).

Drawing of section through upper third of uterus. Note: (1) Broad rounded edges of ununited muscle; (2) the decidua covers these edges and reaches almost to the peritoneum; (3) the narrow band of tissue between peritoneum and decidua on the right side, through which rupture has occurred; (4) the overhanging flap of wide thin scar area, consisting of little else than peritoneum.

Readmitted on November 19, 1915, in a state of collapse in the eighth month of her second pregnancy. Laparotomy by Dr. Drummond Maxwell: the dead fœtus and much blood lay in the peritoneal cavity. There was a rupture through the scar of the former Cæsarean section; the placenta lay almost completely outside the uterus, but still attached to one side of the rent. The uterus was removed by subtotal hysterectomy, but the patient died shortly afterwards.

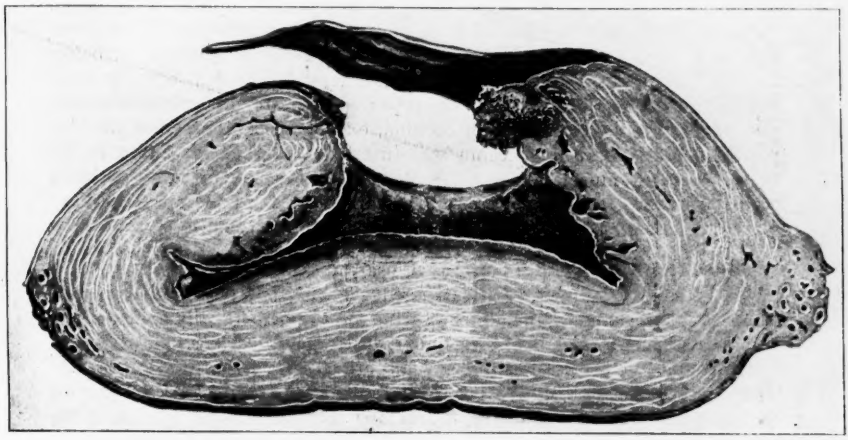

FIG. 2 (Case II).

Drawing through middle of uterus. Note, in addition to points in fig. 1: (1) Insertion of a piece of placenta into left edge of ununited-muscle edge; (2) subperitoneal hæmatoma; (3) the broad thin scar has torn through at one edge and not along its middle.

Description of the Uterus.—A uterus removed by amputation through the cervix, with a long, widely-gaping rupture through its anterior wall. Outside measurements of uterus: Length, 14.5 cm.; greatest width, 14 cm. Uterine cavity: length, 13 cm. Measurements of rupture: Length, 10.5 cm.; width at upper end, 7 cm.; at lower end, 5 cm. Thickness of uterine wall at edges of rupture, 2 cm. near the upper end, decreasing to 1.5 cm. near lower end. Continuous with the lower angle of the rupture is a linear thinned area in the uterine wall, 2.5 cm. long. This is the unruptured part of the scar and is only 0.5 cm. thick. The edges of the uterine wall at the site of rupture are for the most part rounded and smooth. At first sight the impression obtained is that the whole thickness of the uterine wall had been torn through, but closer inspection shows that the decidual lining of the uterine cavity is continued up over these rounded edges, and reaches in most places very close to the torn peritoneum (see fig. 1); at the upper and lower ends of the ruptured area, decidua and peritoneum almost meet. The irregularly torn peritoneal layer overhangs very liberally the thick, decidua-covered edges (fig. 2); in places the peritoneum is thickened by an underlying thin fibrous tissue layer. In the middle two-thirds, on both sides, is a well-defined subperitoneal hæmatoma, extending laterally and

stripping the peritoneum for some distance from the underlying uterine wall. Firmly adherent to the middle third of the whole thickness of the left edge of the ruptured area is a piece of placenta, covered by loosened peritoneum and a subperitoneal hæmatoma (see fig. 2). On the opposite edge the decidual layer is absent, and is replaced by a roughened area covered with broken laminæ of clot; this evidently represents part of the placental site. There are the remains of many thick omental adhesions to the peritoneum over the ruptured area. These findings are to be interpreted as follows: (1) The real scar, through which the rupture occurred, is extremely thin, and consists of little more than stretched peritoneum with here and there a thin layer of fibrous tissue. In its original state, before rupture, no doubt this thin peritoneal scar was covered beneath with decidua. (2) The thick edges of the ruptured area are the ununited muscle wall of the uterus, covered with decidua, except where they enter into the placental site. (3) The placenta was inserted over the scar and into the thick ununited muscle edges. (4) Retroplacental hæmorrhage probably occurred beneath the stretched scar before rupture occurred; in fact, retroplacental hæmorrhage may have been the determining cause of rupture.

Case III.—Reg. No. 1914/40909. Cæsarean section on March 26, 1914, by Dr. Russell Andrews. Patient, aged 28, with flat rickety pelvis, and other skeletal changes, including bowing of the femora, tibiæ and ulnæ. Two former full term labours: (1) 1911, instrumental dead birth; (2) 1912, instrumental live birth. Last menstrual period, August 14, 1913. Admitted to the hospital in thirty-second week of pregnancy, on March 26, 1914, having been eighteen hours in labour; os uteri two-fifths dilated, membranes intact, transverse presentation. After external cephalic version the head was found too large to enter the pelvic brim. Cæsarean section performed; uterus opened by usual anterior median incision; sutured with two layers of chromic catgut, a deep buried one including the whole thickness of the muscle and missing the endometrium, and a continuous Lembert peritoneal suture. Placental site not noted. Child alive, weight 5¼ lb. The convalescence was febrile, the temperature rising daily for thirteen days after operation to 100° or 101° F.

Readmitted, early in her fourth labour, on March 16, 1916, calculated to be thirty-two weeks pregnant. Labour pains began at 2.30 p.m., and were of moderate strength. At 6 p.m. spontaneous rupture of the uterus occurred, accompanied by the usual signs of collapse, pronounced anæmia, cessation of labour pains, and distinctive feeling of the fœtus beneath the abdominal wall. Immediate laparotomy; the dead fœtus, placenta and much blood were in the peritoneal cavity. The scar was ruptured in its entire length; uterus removed by subtotal hysterectomy. Next day the patient got left hemiplegia, but ultimately made a good recovery from the operation.

The specimen is not available for examination, and it is not known whether the placenta was implanted over the scar or not.

Case IV.—Reg. No. 1910/42939. A case of pronounced rickety flat pelvis, with stunted stature and other skeletal changes, including bowing of the femora and tibiæ. Preceding obstetrical history: (1) Instrumental labour at term, dead birth; (2) instrumental labour at term, child lived a few hours; (3) instrumental labour at term, dead birth. In her fourth labour

at term the patient was admitted under the care of the late Dr. Drummond Maxwell on October 11, 1914, and was delivered by Cæsarean section. The usual anterior median incision was made in the uterus, and it was sutured with two layers, deep and superficial, of chromic catgut. Child alive, weight 6½ lb. Convalescence febrile; the temperature rose to 102.8° F. on the second day, and varied between 100° and 103° F. until the seventh day, after which it gradually fell. Placental site not recorded.

Readmitted in her fifth labour, at term, in 1916. Head was engaged in pelvic brim; forceps applied, and a healthy child of 7 lb. delivered. Puerperium febrile; temperature gradually rose to 103° F. on the fourth day, fell by lysis, and reached normal on the ninth day.

Readmitted in her sixth pregnancy, with rupture of the uterus, on August 8, 1919. She had last menstruated on December 1, 1918, and was in regular attendance at the ante-natal department. At 12 o'clock, midday, whilst sitting in a chair, she suddenly got intense abdominal pain, which made her feel very faint. The pain persisted, and as she appeared obviously very ill, her friends summoned assistance at 3 p.m. When the midwifery assistant arrived he found her sitting propped up in a chair and in the last stages of collapse. She was immediately transported to the hospital in an ambulance. On arrival, she was profoundly anæmic, and collapsed; abdomen distended and extremely tender all over; fœtus felt with remarkable distinctness, and what was surmised to be the empty uterus was felt reaching up to the umbilicus. Immediate operation by Mr. Eardley Holland, under stovaine spinal anæsthesia. The dead fœtus, together with a large quantity of blood and many recent clots, was found free in the peritoneal cavity. The placenta was almost completely separated and lying just outside a large gaping rent in the anterior wall of the uterus, a very small part of it being still attached near the left edge of the rupture. After removing the fœtus and placenta, attention was turned to the uterus, which was rigidly contracted and anæmic, and a long, widely-gaping rupture occupied almost the whole length of the anterior wall. The rupture looked like a clean tear, except at its upper and lower ends, where it had extended laterally to a slight extent. Its edges were thick and smooth, giving the false impression that the rupture had occurred through the entire thickness of the uterine wall. Projecting from the thick edge of one side was a ragged leaf of thickened peritoneum, about 1 cm. wide. This was in reality the stretched scar, and it had ruptured, not along its middle, but along its junction with the opposite thick edge. There had been a complete failure of muscular union, and the ununited muscle formed the two thick edges. The rupture was rapidly closed with a single layer of interrupted sutures of No. 3 silk, placed about ½ cm. apart, and including the whole thickness of the uterine wall except the endometrium. The patient made an excellent recovery; for the first week the evening temperature rose to 100° F., but there was no other trouble. She was last seen in excellent health on February 1, 1920; the management of a future pregnancy will be a problem (but refer to case abstract No. 87).

Case V.—Reg. No. 1917/40655. Cæsarean section on February 26, 1917, by Mr. Eardley Holland. Primigravida, aged 20; admitted with eclampsia, in the thirty-sixth week of pregnancy. Had three convulsions before admission, was comatose, and the urine, on boiling, was solid with albumin; cervix intact, no labour pains, fœtal heart heard. Cæsarean section under

stovaine spinal anæsthesia; uterus opened by anterior median incision, fœtus dead, placenta posterior. Incision closed with No. 3 interrupted silk sutures, placed about ½ cm. apart, and including the whole thickness of the uterine wall except the endometrium; this layer was covered with a continuous peritoneal suture. Convalescence febrile; temperature ranged between 100° and 102.6° F. for first seven days, and lochia was offensive. The abdominal wound healed by primary union.

FIG. 3 (Case V).

Puerperal uterus, tubes, ovaries and bladder; bladder and urethra have been laid open. On anterior surface of uterus is a rupture through the lower two-thirds of a Cæsarean section scar. Left half of utero-vesical pouch obliterated by adhesions; right half of the pouch was the site of an abscess cavity, with fæcal contents, communicating both with the uterine cavity through the rupture, and with a perforation in an adherent coil of small intestine.

During her second pregnancy she was a regular attendant at the antenatal department. Last period, May 28, 1919; urine never contained albumin, and health excellent. She was admitted again on January 17, 1920, with severe puerperal sepsis, following premature confinement. Only an imperfect history of her confinement and illness could be obtained.

Labour was completed in a few hours, on January 11, 1920; the placenta was retained, and was removed manually, with some difficulty, two hours after the birth of the child, which lived only a few hours. The following day she got abdominal pain and dyspnœa, and was sent into hospital. On admission into the septicæmia ward on January 17, 1920, she was extremely ill: temperature 104° F., pulse 120, abdomen rigid and tender, constant diarrhœa. She was considered to have puerperal septicæmia, but blood cultures taken on different occasions were sterile. The perineum was completely ruptured into the rectum. For a fortnight she held her ground, and even improved slightly in her general condition. Abdominal section was considered and rejected. In the light of what was found post-mortem, I am bound to admit that if the true condition of affairs had been suspected and her abdomen opened, her life might have been saved. The discharge from her uterus became more and more offensive, and was undoubtedly fæcal in character. She died on February 16, 1920.

A post-mortem examination was made, and I am indebted to Professor Turnbull for the following notes: General purulent peritonitis, with localized abscesses. Fibrous peritoneal adhesions at fundus of uterus, between bladder, uterus, and small and large intestines. Pus tracking up right and left sides of abdominal cavity. Localized subdiaphragmatic abscess in antero-superior surface of the right lobe of the liver, close to the falciform ligament. Perforation, 1 cm. in diameter, in wall of small intestine, 240 cm. below the duodeno-jejunal flexure. Dense fibrous peritoneal adhesions with pus-pockets between the lower coils of small intestine and uterus. Diphtheroid inflammation with slight scarring of vagina. Dilated cervix uteri admitting two fingers. Rounded perforation, 3 cm. by 2 cm., on anterior wall of fundus of uterus. Dirty green diphtheroid inflammation of endometrium. Dilatation with purulent content in left Fallopian tube. Small amount of pus in right Fallopian tube. No thrombi in uterine or ovarian veins. Small empyema between right middle and lower lobes and the diaphragm, the result of spread of infection from subdiaphragmatic abscess. The pelvic viscera were removed *en masse*, and show the following details (see fig. 3): Uterine cavity, 7 cm. long, 4 cm. laterally, and 4 cm. antero-posteriorly. The rupture measures 3 cm. by 2 cm., with rounded smooth edges; the right edge is 1.5 cm. thick and the left 0.5 cm. The edge at the upper angle of the rupture is thin (0.5 cm.), where it is continued into the unruptured part of the scar. The unruptured part, which can be seen and felt as a thin furrow on the inner surface of the anterior wall, measures 1.8 cm. long; it is not visible on the outer surface, as it is covered by adhesions. The scar had, therefore, ruptured in its lower two-thirds. There are the remains of many old firm adhesions over the anterior surface and fundus of the uterus, one particularly broad and firm, one covering the unruptured part of the scar. The left half of the utero-vesical pouch of peritoneum is obliterated by dense adhesions between the bladder and the uterus; to the right of the midline it was occupied by an abscess cavity, with fæcal contents. This abscess communicated with the already-mentioned tear or perforation in the small intestine and with the uterine cavity, through the rupture. Thus, there had been a utero-intestinal fistula.

Whether the intestine was injured at the time the rupture occurred, or whether the perforation arose subsequently cannot be said for certain. I favour the former view.

A point of special interest in this case is whether the scar ruptured spontaneously during labour, or whether it was ruptured during the difficult manual removal of the placenta. In the light of other reported cases I am inclined to think it ruptured during labour, and that the rentention of the placenta, as well as the difficulty of its removal, was due to its partial escape into the peritoneal cavity.

(II) On the Ætiology and Pathology of Ruptured Scars, with Analysis of Reported Cases and Critical Review of the Literature.

I have found accounts of ninety-two cases, reported in sufficient detail to make them worth collective study, and have made a short abstract of the essential facts of each case.[1] These have been got direct from the original source, with the very few exceptions where the original accounts were not accessible and I had to rely on abstracts made by others. I have omitted a few cases to which I found references, but of which I could neither get at the original report nor find reliable abstracts. It is obvious, too, that many cases have never been published at all; speakers in discussions before Societies on the subject of ruptured scars often refer to such cases, personal or otherwise. Up to a point, references to cases were not hard to find, and I am indebted to other writers who have published collections of cases, especially to L. Singer (1909), Albert Wyss (1912), Palmer Findley (1916), and E. Schroeder (1916).

The classical operation dates from 1882, when Sänger and others published their improved suture methods. I need hardly state that I have not included cases of ruptured scar following the operation of pre-suture days: one half of the minority who survived this operation got a ruptured scar in the unfortunate event of a future pregnancy. The case in my list, Koblank's, occurred in 1891, and more than two-thirds have been reported since 1910, coinciding with the period when the indications for Cæsarean section began to be extended.

In each case abstract the following essential points are noted: Age, parity. At Cæsarean section: Indication, uterine incision, placental site, suture material, recovery afebrile or otherwise. Number of Cæsarean sertions, labours intervening between Cæsarean section and rupture. At rupture: Interval since Cæsarean section, period of pregnancy, in labour or not, placental site, peculiarities in symptoms or their onset, accidental factors, extent of rupture, treatment, result to mother and child. Unfortunately, all cases are not reported in full detail; but, amongst the sum of the cases the data are in sufficient number to indicate the

1. These abstracts are printed in full in the *Proc. Roy. Soc. Med.*, 1920, vol. xiv (Obstet. and Gyn. Sect.), pp.

chief factors favouring rupture of the scar. The case abstracts will be found at the end of the paper, numbered and with their references.[1] I have isolated the essential points of these ninety-two reported cases, and of my own five, in the following summary, so that the extent to which each one occurs can be conveniently noted, and its individual importance estimated.

Parity.

Rupture occurred in the second pregnancy	in 54	cases
" " third "	" 19	"
" " fourth "	" 10	"
" " fifth "	" 6	"
" " sixth "	" 3	"
" " eighth "	" 1	"
Number of preceding pregnancies not mentioned	" 4	"

Indications for Cæsarean Section.

Contracted pelvis	in 64	cases
Eclampsia	" 12	"
" Nephritis "	" 1	"
Albuminuria of pregnancy	" 1	"
Dermoid cyst of ovary	" 2	"
Fibromyoma of uterus	" 1	"
Hæmatoma of vagina and vulva	" 1	"
Sacral tumour	" 1	"
Stricture of cervix	" 1	"
Vaginal varices	" 1	"
Shoulder presentation	" 1	"
Concealed accidental hæmorrhage	" 1	"
Indication not mentioned	" 10	"

The Cæsarean Section Incision.

Anterior median	in 54	cases
Posterior median	" 1	"
Transverse fundal	" 28	"
Anterior median and transverse fundal	" 1	"
Cervical	" 1	"
Site of incision not mentioned	" 12	"

Relation of Incision to Placental site at Cæsarean Section.

Incision through placental site	in 10	cases
Incision not through placental site	" 6	"
Placental site not mentioned	" 81	"

Suture Material.

Catgut	in 41	cases
Silk, often with continuous catgut for the peritoneum	" 12	"
Reindeer tendon	" 1	"
Suture material not mentioned	" 43	"

1. Refer to *Proc. Roy. Soc. Med.*, 1920, vol. xiv. (Obstet. and Gyn. Sect.).

Fever or Sepsis during recovery from Cæsarean Section.

Recovery febrile, or abdominal or uterine infection ...	in	51 cases
Recovery stated to be afebrile	„	15 „
No details mentioned	„	31 „
Cases with afebrile recovery are ... Nos. 11, 12, 16, 17, 20, 22, 27, 41, 42, 43, 58, 81, 82, 84 and 93		

Interval between Cæsarean Section and Rupture.

Less than one year	in	2 cases
One year	„	12 „
Two years	„	25 „
Three years	„	21 „
Four years	„	13 „
Five years	„	3 „
Six years	„	3 „
More than six years (including one of eleven and one of twelve)	„	4 „
Interval not stated	„	14 „

Number of Cæsarean Sections preceding Rupture.

One	in	88 cases
Two	„	6 „
Three	„	2 „
Number not mentioned	„	1 „

Number of Labours intervening between Cæsarean Section and Rupture.

None	in	85 cases
One	„	8 „
Not stated	„	4 „
The numbers of the cases in which an intervening labour is reported are as follows: ... ... Nos. 17, 19, 30, 40, 43, 59, 64, 96		

Period of Pregnancy at which Rupture Occurred.

Term	in	47 cases
Near term	„	6 „
8½ months	„	1 „
8 „	„	10 „
7½ „	„	1 „
7 „ (Nos. 2, 22, 53, 65, 70, 88, 90)	„	8 „
4, and again at 7 months (No. 34)	„	1 „
38 weeks	„	3 „
37 „	„	2 „
36 „	„	4 „
32 „ (Nos. 77, 95)	„	2 „
"Early pregnancy" (No. 15)	„	1 „
Eleven months, post mature (No. 48)	„	1 „
Period not stated	„	10 „

Whether Rupture occurred during Labour or during Pregnancy before the onset of Labour.

In labour	in	19 cases
In labour, early in first stage	„	29 „
During pregnancy, before the onset of labour	„	36 „
No details given	„	13 „

Relation of Placenta to Scar at time of Rupture.

Placenta implanted over scar	in 34 cases
Placenta not implanted over scar	„ 17 „
Placental site not mentioned	„ 46 „

Accidental Factors likely to have been Exciting Cause of Rupture.

None mentioned	in 80 cases
Nos. 20 and 35, Hydramnios	„ 2 „
„ 3, Twins and hydramnios	„ 1 „
„ 26 and 43, Version	„ 2 „
„ 59 and 61, Induction and version	„ 2 „
„ 88, Accidental hæmorrhage	„ 1 „
„ 14, Accident	„ 1 „
„ 30, Difficult breech labour	„ 1 „
„ 48, Post mature fœtus	„ 1 „
„ 55, Fœtus excessively large	„ 1 „
„ 65, Placenta prævia, hydrostatic bag	„ 1 „
„ 74, Pituitrin	„ 1 „
„ 84, Pituitrin and obstructed breech labour	„ 1 „
„ 97, Manual removal of placenta	„ 1 „
„ 19, Long labour, with contracted pelvis	„ 1 „

Extent of Rupture.

Rupture of entire or almost entire length of scar	in 67 cases
Rupture of small portion only of scar	„ 22 „
Extent not mentioned	„ 8 „

(Small perforation only in Nos. 19, 21, 24, 28, 33, 38, 41, 47, 49, 50, 56, 66, 70, 71, 78, 81, 82, 83, 84, 90, 93, 97)

Treatment of Rupture.

Hysterectomy, subtotal	in 56 cases
Vaginal hysterectomy	„ 2 „
Suture, sometimes with excision of edges	„ 26 „
Drainage	„ 2 „
Treatment not stated	„ 1 „
Death before operative treatment	„ 10 „

Result to Mother.

Lived	in 66 cases
Died	„ 28 „
Not mentioned	„ 3 „

Result to Child.

Dead	in 69 cases
Lived	„ 21 „
Not mentioned	„ 7 „

On the Anatomy of the Uterine Scar.

(*A*) *Perfectly Healed Scars.*—Perfect healing of the uterine incision may result in complete muscular regeneration, leaving no trace of scar tissue except on the peritoneal surface. Whitridge Williams has studied the cicatrix in ten uteri, removed by Cæsarean

hysterectomy, which had been subjected to Cæsarean section upon one or more previous occasions. In eight of his specimens (one of which had been subjected to two, and another to three previous Cæsarean sections) it was difficult to find the old cicatrix by examination with the naked eye; the only indication of its existence was the presence of slight vertical depressions upon the external and internal surfaces of the uterus. Microscopical examination revealed the entire absence of scar tissue in the uterine wall, and showed the muscle fibres extending across the site of the old incision as if it had never existed. It is interesting to note that the convalescence from the previous operations had been uncomplicated. In another specimen, deep furrows existed on the external and internal surfaces of the uterus, the two being separated by a band of tissue 3 mm. thick, in contrast to the adjacent uterine walls which measured 2.5 cm. in thickness. The external furrow was covered with peritoneum, and the internal was lined with typical decidua; the intervening tissue was normal muscle, showing no trace of scar tissue, and differing from the normal only by its thinness. The history of this patient was that the convalescence had been stormy. Jolly, in his case (abstract No. 50), describes perfect muscular regeneration in the unruptured part of the scar.

(*B*) *Thin Scars.*—Light is thrown on the causes and anatomy of ruptured scars by studying scars that are thin, for it is only thin scars that are likely to rupture. A thin scar becomes progressively stretched and thinned during pregnancy, owing to the increasing distension of the uterus. Thinning of the scar, as found at a repeated Cæsarean section, or in a uterus removed for some reason from a patient who has formerly had a Cæsarean section, is not at all uncommon, every obstetric surgeon of experience has encountered it. Harrar, at the New York Lying-in Hospital, found that in fifty instances of the repeated operation, in forty-two the old scar was either not found at all, or, if found, was solid; in four there was marked attenuation, in two there was partial rupture at the location of the old scar, and in two there was complete rupture. Van Leuwen collected all cases of repeated operation reported in literature down to 1903, and found thin scars reported in twenty out of 117 cases. These figures probably represent cases of extreme thinning only; a moderate degree of thinning, or extreme thinning of a small portion of the scar is, in my experience, much commoner than this, if looked for by palpating the whole length of the scar, after the uterus has been emptied, between a finger within and a finger without the uterus. By various writers these wide thin scar areas, as found at repeated operations, have been described as "thin as paper, only 1 to 2 mm. thick," and have sometimes been mistaken for the bulging amnion herniated through

the scar. Sometimes a subperitoneal hæmatoma has been observed, an indication of imminent rupture. There are, of course, varying degrees of thinning of the scar. Sometimes it is extreme, sometimes moderate: sometimes the entire length of the scar is affected, sometimes only a part. The only case I have found recorded in which the thin scar consisted of normal muscle is that of Whitridge Williams, to which I have already referred. In all others it was composed of scar tissue, often with a varying proportion of muscle fibres scattered through it. In my own second case the unruptured part of the scar consists almost entirely of scar tissue, but muscle fibres, singly or in groups, are scattered through it, and have even grown right across its whole width. In cases of extreme thinning the attenuated scar area consists merely of peritoneum in contact with decidua, with a few intervening strands of fibrous tissue. These attenuated peritoneo-decidual scars are just the scars liable to rupture during pregnancy or labour from a rise of intra-uterine pressure. The point of greatest importance about these scars is that the uterine muscle has completely failed to unite: the sutures employed to close the incision either slough out or cut out, and the muscle surfaces retract, and become widely separated. The peritoneum, on the contrary, holds firm. The retracted muscle surfaces later become smooth and rounded, and in course of time covered by a layer of endometrium, which, in a subsequent pregnancy, is converted into decidua. The endometrium grows also across the line of the scar beneath the peritoneum, and covers the inner surface of the gap. Further thinning of this peritoneo-decidual scar is the natural sequence of the distension of the uterus during pregnancy. The analogy between such a scar and a defective abdominal scar is irresistible; the one consists of peritoneum and decidua, and the other of peritoneum and skin; in both the muscle is wanting. In some cases even peritoneal union has been demonstrated to have failed in parts of the scar, and the gaps have been plugged by adherent omentum or bowel. Excellent histological studies of thin scars have been published by Couvelaire, Offermann, Spalding and others.

(*C*) *Ruptured Scars.*—Good anatomical and histological descriptions of the ruptured scar are given in the case abstracts, Nos. 2, 11, 16, 17, 20, 27, 31, 32, 33, 35, 43, 46, 50, 55, 56, 60, 72, 73, 80, 82 and 84. There is no doubt that when the scar has ruptured it has nearly always been one of the thin scars I have described in the foregoing section. The peritoneo-decidual scar has gradually been converted into a widely stretched area, during the progressive uterine distension. When this thin area ruptures it has usually been noticed that the line of rupture does not occur along its middle, but at the sides, near the thick part of the uterine wall. A

thick, or even a moderately thick scar, whether composed of fibrous or muscular tissue or both, does not rupture except under extreme provocation, such as obstructed labour. The appearance of a ruptured scar, after the uterine contents have escaped, and retraction has occurred, is deceptive, and has, in the earlier observed cases, led to wrong descriptions and tortuous explanations. The deceptive feature is the thickness of the edges of the ruptured area. These edges, as already pointed out, consist of the ununited muscle surface covered with decidua. After the uterus is emptied and retracted these muscle edges become extremely thick—equal in thickness indeed to the rest of the uterine wall. Furthermore, these thick edges, since chorion or placenta has been separated from off them, are either found oozing blood or covered with pieces of blood clot. In fact, their appearance is almost exactly as if the whole thickness of the uterine wall had been newly torn through, whereas in reality it is only the stretched deciduo-peritoneal area that has given way. The true state of affairs is illustrated in figs. 1 and 2, where the decidua can be followed from the uterine cavity over the ununited muscle edges almost up to the ruptured peritoneal coat. In my own fourth case, where I sutured the rupture, I believed I was suturing thick recently ruptured surfaces; it is only in the light of the experience from my second case, and of cases reported in the literature, that I now realize I sutured together the old ununited muscle surfaces.

It is interesting to note that for many years the true significance of the decidual covering to the muscle surfaces was missed; it was supposed that during pregnancy decidual cells grew up through the scar to the peritoneum, weakening the scar and making it liable to rupture (refer to case abstract No. 16).

Liability of Uterine Incision to yield shortly after Operation.

It is not often that Cæsarean section cases come to post-mortem, and it is even rarer for a case to be reopened for hæmorrhage or sepsis. In such cases it is surprising how often there has been observed a yielding of the incision from the loosening or cutting through of the sutures. Wyss has made a small collection of these. Scheffzek reports having seen two post-mortems after Cæsarean section, in which the catgut sutures had become completely unknotted. Boissard reports the case of a patient who died from sepsis on the fifth day; four of the interrupted catgut sutures had become untied and the incision gaped widely, there was intraperitoneal hæmorrhage and the uterine cavity was filled with blood clot. Cristalli reports a case in which, because of severe and persistent hæmorrhage following Cæsarean section, subtotal hysterectomy was performed; a gap was found in the line of uterine

incision, which had been sutured with silk. Le Page reports a somewhat similar case, in which the uterus had been sutured with catgut. One is led to believe that this accident may sometimes happen in cases that recover; they would not necessarily pass through a stormy convalescence, for such an accident, without sepsis or with only local sepsis, should not produce much disturbance. The partially or completely gaping scar would quickly be sealed or plugged by omentum. It is quite probable that the firm adhesion of omentum to the old scar, so commonly found in cases of repeated Cæsarean section or subsequent rupture, may represent the same protective plug.

Utero-abdominal Fistula.

This is not a great rarity, following infection of the uterine and abdominal wounds; it may persist for many months. The uterine scar, in such cases, is bound to be extremely defective and liable to rupture in the event of subsequent pregnancy. Amongst the case abstracts, utero-abdominal fistula will be found noted in Nos. 14, 32, 34, 45 and 51. Case No. 34 is peculiar: at the fourth month threatened abortion resulted in partial rupture of the scar and the formation of a utero-abdominal fistula through which a piece of intestine could be seen adherent to the scar; at the seventh month a more extensive rupture occurred, resulting in death of the patient in spite of operation.

If, accompanying the fistula, the uterine scar is completely adherent to the abdominal wall, subsequent rupture may be entirely extra-peritoneal. An interesting example of this is recorded by Noble (not placed amongst the list of ruptured scars). A utero-abdominal fistula persisted after the first Cæsarean section; another pregnancy soon followed and the liquor amnii escaped through the fistula in the thirty-third week. The second Cæsarean section was performed by enlarging the fistulous opening; the uterine scar was found completely adherent to the abdominal wall, and the operation was entirely an extraperitoneal one.

On the Site of the Uterine Incision and Subsequent Rupture.

On referring to the summary of reported cases it will be noted that, in the eighty-five cases where the site of incision was stated, the classical incision was employed fifty-five times, the tranverse fundal incision twenty-eight times, and the cervical incision only once. There is no doubt that the transverse fundal incision, introduced by Fritsch in 1897, is specially liable to rupture. Ekstein (abstract No. 50), reported the first case of ruptured fundal scar in 1904. The number of ruptures after the transverse fundal incision compared with the number after the classical operation is

relatively very high, considering how late it was introduced, and how relatively few must be the number of Cæsarean sections in which this incision was employed. Two points theoretically favour rupture of tranverse fundal scars; one is that most of the muscle bundles are cut at right angles, and the incision therefore tends to gape widely, favouring imperfect union; the other is that the fundus is the part of the uterus which is relatively most distended during pregnancy, and, in consequence, a fundal scar will be relatively more stretched than the scar of the classical operation. There have been comparatively few reports of the successful termination of pregnancy and labour after the transverse fundal incision. This incision is, in fact, to be avoided because of its liability to rupture.

The incision that at present holds the best record for immunity from rupture is the cervical (by this I mean the transperitoneal or extraperitoneal cervical operations, of which, as is well known, there are many varieties). All the same, before this incision is lauded because of its apparent immunity from rupture, it must be remembered that very few cervical Cæsarean sections have, up to now, been performed, compared to the thousands of classical and transverse fundal Cæsarean sections; it still has to stand the test of time.

The cervical incision was first employed by Frank in 1906. It was at once pointed out by the theorists that the cervical scar would be specially prone to rupture; it lay in that part of the uterus most subjected to stretching during labour, and, being placed nearer the contaminated area (*i.e.*, the vulvo-vaginal tract) would therefore be more liable to infection. These fears of rupture have not been fulfilled; only one case has been reported (abstract No. 72) and only a small number of thin cervical scars have been observed, in spite of the fact that many cases of subsequent pregnancy have occurred. There seem to be excellent reasons for the sound healing of cervical scars, and for their resistance to rupture. Rest is an essential to good union of divided muscles; a state of rest or immobility is impossible in the body of the puerperal uterus, where contractions and relaxations are constantly tending to disturb the apposed surfaces and draw the healing muscle fibres apart; all operators are aware of the great lateral tension on the sutures, and of the tendency of the incision to gape during a strong contraction. On the other hand, the cervical incision is situated in a quiet part of the uterus which does not undergo contractions and relaxations. In Frank's original operation he incised the cervix transversely; this has now been generally replaced by a longitudinal incision. Mechanically, the stretching and rupture of the transverse scar would seem more likely, because its line lies at right angles to the direction of the chief pull of the uterine muscle fibres; whereas the

longitudinal scar lies in the line of the pull, and its edges have scarcely any tendency to be drawn apart.

As regards the reported case of rupture of a cervical scar (abstract No. 72), it is only fair to state that at the Cæsarean section the cervical incision had to be prolonged for a short distance upwards into the body of the uterus in order to give more room for the fœtus, and it is quite possible that the rupture started in this part of the scar.

Some reports on thinning of the cervical scar are the following: Traugott reports a case where the first Cæsarean section was a Frank's cervical one, done for contracted pelvis. The next pregnancy was a placenta prævia, in the eighth month, with natural delivery; the third time, at term, another cervical Cæsarean section was done. The cervical wall, in the region of the old incision, was thinned out to a membrane 1 mm. thick, and was on the point of rupturing. The first Cæsarean section was an infected one, and the recovery was septic. Sellheim (*see* under Traugott), out of five cases with later pregnancy, saw the same thinning in one of them. Bumm (*see* under Traugott, and Jolly) had done second operations in three cases; in two the scar was sound, in the third the scar was so stretched and thin that he thought at first it was distended bladder; in reality it was the scar bulged by the liquor amnii.

Reports of cases of cervical Cæsarean section with subsequent pregnancy, terminating either by repeated operation or natural delivery, are given by Hartmann, Lichtenstein, Litschkuss, Rohrbach and Scheffzek, amongst others. Hartmann reports twelve cases, three of which were delivered by the natural passages, and nine by repeated operation; in none was there rupture or thinning of the scar. Lichtenstein reports two cases of subsequent delivery after the extraperitoneal operation, one by repeated operation, and the other by the natural delivery of twins; no complications were noted. Rohrbach followed up thirty-eight cases of cervical Cæsarean section, and found three subsequent deliveries: one normal full time labour and two repeated operations. Scheffzek reports ten cases of pregnancy subsequent to extra-peritoneal Cæsarean section: five with repeated operation, and five with delivery by the natural passages.

The above are only a few of the published lists of pregnancies subsequent to cervical Cæsarean section, but the numbers are all so small that it is hardly justifiable to draw conclusions. I believe I am right in stating that up to the present time no further case of rupture of the cervical scar has been reported. The operation is certainly gaining favour, especially in America; British and French obstetric surgeons are still shy of it. The low mortality reported by exponents of cervical Cæsarean section is

remarkable compared to that of the classical operation: For the transperitoneal operation up to 1914, Hofmeier reports forty-five cases, with one death; Baisch reports nineteen cases, without a death; Frank reports 130 cases with two deaths; giving a total of 194 operations with three deaths. Half of these were suspect or infected cases. For the extraperitoneal operation, Küstner had 110 cases without a death, of which again half were suspect or infected. The grand total comes to 304 cervical operations, with three deaths—a very remarkable figure, especially as a large number of the patients was infected.

Although the consideration of scars resulting from vaginal hysterotomy (so-called vaginal Cæsarean section) does not belong to the subject of rupture of the Cæsarean section scar proper, it is interesting to consider the possibility of their rupture in a subsequent pregnancy or labour, since in both vaginal hysterotomy and cervical Cæsarean section the incisions lie in much the same part of the uterus. The behaviour of these scars in subsequent labour has been investigated by Olow; he reports seventeen cases, mostly performed for eclampsia; in none of them was thinning or rupture of the scar observed. Engström reports a case of rupture of the lower uterine segment six years after vaginal hysterotomy for vesicular mole. The case was one of obstructed labour from pelvic contraction, and the retraction ring reached almost to the umbilicus. The site of rupture corresponded to the line of the scar; but the case is hardly a fair one, as rupture would have probably occurred in any case, former operation or no. An example of rupture of the scar of a deep cervical incision (made for placenta prævia) in a subsequent labour is reported by Labhardt. I have not found any reference to vaginal hysterotomy scars beyond these few.

The Influence of Implantation of the Placenta over the Scar.

The relation of the placenta to the scar at the time of rupture was noted in fifty-one of the ninety-seven cases; in thirty-four cases is was implanted over the scar, and in seventeen it was not. From this it may be assumed that the implantation of the placenta has at all events a share in predisposing the scar to rupture, but far too great importance has in the past been attached to this point. That the placenta cannot be the direct cause of rupture is obvious enough, for on the one hand, the placenta is very often not over the scar in cases of rupture, and on the other, in cases of repeated Cæsarean section it is often found over the scar without any harmful effect. The idea that implantation of the placenta over the scar was the cause of rupture came very early into the field. It was known that rupture of the pregnant tube was caused by

the eroding action of the villi, and that in certain cases of placenta prævia the lower uterine segment was appreciably weakened and more liable to traumatic rupture. An analogy between these two and scar rupture was tempting; but there is no histological evidence to show that chorionic villi invade the scar tissue any more than they do normal uterine tissue. It has also been suggested that when at the original Cæsarean section the incision is over the placental site perfect healing is interfered with; there is no histological evidence for this. Amongst the ninety-seven cases of ruptured scar the relation of the incision to the placental site of the original Cæsarean section is only mentioned in sixteen cases, in ten of which the incision was over the placental site. Nothing can be inferred from these figures; it must be remembered that when the operator encounters the placenta in his incision he may state the fact in his records, but that he is much less likely to state the negative fact. A large number of uteri which bear Cæsarean section incisions, removed subsequently by hysterotomy, and where the full details of the Cæsarean section are known, has now been reported (refer to Whitridge Williams and Spalding amongst others). No fact has been forthcoming to show that the placenta has any influence on the healing of Cæsarean section incisions, or on the rupture of Cæsarean section scars by tissue invasion.

I believe the real reason why implantation of the placenta over a thin scar makes it liable to rupture is the occurrence of retro-placental hæmorrhage. The first step towards this is a gradual yielding and widening of the scar area; there follows a very gradual, and probably very slight, separation of the placenta over and adjacent to the scar area. The mechanism of this separation is comparable to the separation of a placenta prævia from the lower uterine segment when the cervix begins to dilate. Hæmorrhage between the scar area and the placenta will bring about a sudden rise of pressure sufficient to precipitate rupture. In my own Case II there was beneath the peritoneal scar area a well-defined subperitoneal hæmatoma, which had extended laterally, stripping the peritoneum off the uterine wall; I do not think this occurred entirely after the event. Attention is directed to case abstract No. 85, in which there was a well-defined blood clot on the maternal surface of the placenta, and there can hardly be any doubt that hæmorrhage between the scar area and the placenta was the direct cause of the rupture.

On the Effect of Sepsis on the Healing of the Uterine Wound.

Of all the causes of imperfectly healed scars, sepsis is by far the most important. Reference to the table shows that the presence

or absence of raised temperature or of sepsis during recovery from the Cæsarean section is mentioned in sixty-six cases; in as many as fifty-one cases either raised temperature, or definite uterine or abdominal sepsis is noted. In only fifteen of the sixty-six is an afebrile recovery noted. It is, of course, obvious that infection and suppuration of the uterine incision must, of necessity, be followed by imperfect healing. If the septic process be severe, the uterine tissues included between the sutures will undergo necrosis; the sutures will cut out, the muscular walls will retract, and the end result will be a scar which consists of little more than peritoneum with a protective layer of omental or other adhesions. Even if the sutures do not cut out, the wound will have to pass through a stage of granulation tissue, and will result in a broad fibrous scar. If silk be employed, the suppurative process will continue until the silk sutures have come away; cases have been recorded in which silk sutures were found in the uterine discharges. Of the two cases recorded by Wyss, in one silk stitch sinuses persisted for many months, and in the other, after a persistence of stitch sinuses, the linen thread sutures were removed from the interior of the uterus by curetting. If catgut be employed, its absorption will be hastened by sepsis. The point will be raised that in fifteen cases of rupture there was no evidence of sepsis in that the convalescence was afebrile. But infection of the uterine wound may occur without rise of temperature, or with only a very slight one; for example, few will deny that the presence of extensive adhesions to the scar at a subsequent operation is evidence of sepsis during the healing process, and there must be a good many operators who have found these adhesions when the temperature chart of the original Cæsarean section did not betray any indication of sepsis. For example, in 1913 I performed a second operation on a patient on whom the first Cæsarean section had been performed in 1902 by the late Mr. John Taylor, of Birmingham; I found extensive adhesions of the omentum to the abdominal wall and to the uterine incision, accompanied by such a number of enormously distended blood-vessels, that I had to eventrate the uterus and incise its posterior wall. After the uterus had been emptied, palpation of the old scar showed that it was extremely thin in places, and formed a series of deep pits on the inner surface of the uterus. I was fortunate enough to obtain complete notes and temperature charts of the first operation. The temperature had been charted every two hours during the first five days; on the second day the highest record was 99.6°F., on the third 99°F., on the fourth 98°F., and on the fifth 98.4°F. During the following days the only records above normal were 99.2°F. on the ninth day, 99.8°F. on the eleventh, and 99.6°F. on the fourteenth. The abdominal wound healed by

primary union, and the patient made an exceptionally smooth convalescence. Silk was employed to suture the uterus. Here there had clearly been infection of the uterine wound, and yet the temperature chart did not betray it. If the abstracts of cases with the afebrile recovery be referred to it will be noted that the ruptured scar was of the same thin peritoneo-decidual nature, in no way differing from other cases. The point is that although the temperature chart may be a smooth one, infection of the uterine wound may occur, sufficient to impair healing.

In connexion with infection of the uterine wound, I believe that the operation of Cæsarean section can never be guaranteed as a surgically clean one; for there is a large wound in a mucous cavity in direct communication with, and within a short distance of, a contaminated area (the vulvo-vaginal tract). I admit that pathogenic bacteria capable of infecting the tissues are seldom present in a normal vagina, unless vaginal examinations have been made. This is a point I will not enter into any further, as it would have to be very closely argued; but it is sufficiently well known that hæmolytic streptococci have frequently been found in the normal puerperium, not only in the vagina, but also in the apparently healthy uterus. I have been surprised by the large number of Cæsarean section cases in which the recovery was febrile; in the London Hospital and City of London Maternity Hospital series of eighty-four cases, recovery was afebrile in only thirty-eight, or 45 per cent. (trivial rise of temperature in first forty-eight hours of course not counted). I only make this as a general statement, and think it is a point which might advantageously be inquired into.

A study of the type of convalescence from the Cæsarean section is of the utmost importance in arriving at a decision as to the management of future pregnancies. If the convalescence has been febrile and there has been other evidence of sepsis, the scar is probably thin and there is risk of rupture. If, on the other hand, convalescence has been afebrile, the chance of rupture is a very small one, but it is quite plain that there is no absolute guarantee against rupture, since an appreciable number of cases of rupture have been reported even after an afebrile convalescence. On the other hand, it can be shown that patients whose convalescence has been accompanied by even considerable fever can successfully deliver themselves on a future occasion by the natural passages.

To sum up, it cannot be too strongly emphasized that infection of the uterine wound is, above all others, the essential cause of weak scars.

On Suture Material and Method of Suture.

In all the cases under review (except in case abstract No. 13) the entire thickness of the uterine wall was sutured either by

introducing buried layers, or by using deep sutures which passed through the whole thickness of the uterine wall except the endometrium. There is no need to dwell upon this point, as it may be taken for granted that all modern operators take good care to unite the whole thickness of the uterine wall.

Great controversy has raged over the question of the best suture material for closing the uterine incision. On looking at the table it will be noted that, out of the fifty-three cases in which the suture material used for the deep sutures is mentioned, catgut was employed in forty-one, and silk in twelve; in most of the cases in which silk was used there was also a superficial peritoneal suture, burying the knots of the deep layer. It would be false reasoning to conclude from these figures that rupture is more liable to occur after catgut than after silk. Before it is justifiable to come to such a conclusion it would be necessary to know the relative frequency with which silk and catgut were employed. In Great Britain, up to the year 1910, Dr. Amand Routh's book tells us (p. 23) that, of the eighty-one operators who sent him particulars, forty-one used silk for the deep sutures, twenty-seven catgut, eight silkworm gut, and four linen thread. Since the date of this inquiry, amongst those surgeons who have sent me particulars of their cases for the period under investigation (1912-18) the use of catgut is far more customary than that of silk (see p. 518). From reading modern textbooks and monographs by American and German authors it is apparent that catgut is almost universally used in those countries; in France, silk is still preferred. There seems to be no doubt that catgut has been in the past, and still is, far more commonly employed than silk. It is not justifiable therefore to conclude from the figures relating to the use of catgut and silk respectively, in cases of ruptured scar, that catgut is more blameworthy than silk.

The suture material can, of course, only be of importance during the process of healing, and so long as a slowly absorbable preparation of catgut, such as chromic, is used, capable of resisting absorption for at least three weeks, there can be no objection to its use so long as the wound is healing aseptically. A point that has been emphasized is that in the involuting uterus the intracellular enzyme activity is considerably raised, and that therefore a protein material, such as catgut, would be absorbed more quickly than in other tissues; this point is a sound one, and is sufficient reason for not employing plain catgut, which is quickly absorbable. If the uterine incision becomes infected, the process of healing is of course considerably delayed, and the absorption of catgut hastened; for this reason I think catgut has serious disadvantages. In the case of an infected wound, the muscular edges of which are constantly tending to be drawn apart by the retractile power of the muscle, it

is important that the edges should be kept in apposition for as long as possible. Here catgut fails, and a less absorbable material is far preferable. Since it is, in my opinion, impossible to guarantee aseptic healing of the uterine incision, I believe that catgut should be avoided.

Considering now the two types of non-absorbable suture, we have to consider silk or linen thread, and silkworm gut. Theoretically, silkworm gut is by far the preferable of the two; it is well known that if infection occurs silk encourages the process of suppuration, which goes on almost indefinitely, and seldom ceases before the sutures have come away naturally or have been removed. Silk, in an infected wound, is an irritant, and an inveterate harbourer of bacteria. On the other hand, silkworm gut is an absolutely inert material in the presence of bacteria, and the presence of silkworm gut sutures has little or no influence in prolonging the suppurating process. My own opinion is strongly in favour of the use of silkworm gut for the deep uterine sutures, firstly because it is a non-absorbable material and will hold the sides of the uterine incision in place for an indefinite period of time, unless, of course, they cut out owing to an extensive necrosis of the tissues; secondly, because it is an inert material in the presence of bacteria. It is interesting to note that there has been reported no case of ruptured scar in which silkworm gut has been employed. It would be wrong, of course, from this to jump to a too obvious conclusion; the fact may well be explained because silkworm gut is relatively very seldom employed in Cæsarean sections.

Another point I consider of great importance in suturing is to wait for complete retraction before inserting the sutures: if the wound is sutured before retraction is complete, and the muscular walls are thin, the result is bound to be a scar thinner than the rest of the uterine wall; for the sutures fail to include layers of muscle fibres which during complete retraction would have slid inwards and become rearranged, adding to the thickness of the sides of the incision.

Accidental Factors in Causation of Rupture.

Any circumstance in pregnancy or labour which is likely to strain the scar to an exceptional degree may precipitate rupture in a case in which, under ordinary circumstances, the scar, though a weak one, might have remained intact. Such circumstances in pregnancy are the over-distension of the uterus by hydramnios, excessive size of the fœtus, or twins, a large retroplacental hæmorrhage, or the introduction of a hydrostatic bag; in labour, prolonged or obstructed labour, internal version or the use of pituitrin. In case abstract No. 14 the patient fell out of bed and got symp-

toms suggestive of rupture. It will be noted that such accidental factors are recorded in only seventeen of the ninety-seven cases. A study of these cases points the moral that patients who bear Cæsarean section scars should not be allowed long labours and that the employment of version, bags, or pituitrin and such-like drugs, is to be avoided.

Some Clinical Points.

Parity, interval between the Cæsarean section and rupture, number of Cæsarean sections preceding rupture, treatment, and result to mother and child, require no further comment here. The bare facts are sufficient, and will be found in the summary of cases. Other points deserve closer consideration.

Labours intervening between Cæsarean Section and Rupture.—In eight cases one delivery by the natural passages occurred between the two events. Why did the uterus stand the stress of one pregnancy and labour, only to yield to it in the next? We naturally turn to inquire whether any additional stress had been put on the scar beyond that of the normal state; whether anything occurred likely to have raised the intra-uterine pressure or to have increased the difficulties of labour? In four cases (see abstracts) we find unusual circumstances; in No. 19, the labour lasted twenty hours and the pelvis was contracted; in No. 30 the placenta was implanted over the scar; in No. 43 delivery was by internal version, and in No. 59 labour was induced by a hydrostatic bag for toxæmia of pregnancy. In the other four there was no abnormality of pregnancy or labour; it is unwise, therefore, to indulge in any false sense of security merely because a patient has already delivered herself by the natural passages.

Period of Pregnancy at which Rupture occurred.—In seventy out of the eighty-seven cases in which the period is stated, the scar ruptured at full term or within a month of it. In Case 15 (full details in the abstract) either the scar had ruptured at a very early period of pregnancy, or, what is much more likely, the original Cæsarean section incision had always remained open from imperfect healing, and was sealed by adhesions only; the ovum had developed partly in the uterus and partly in the abdominal cavity. The fœtus lay in an intraperitoneal gestation sac—a case of secondary abdominal pregnancy. In Case 34, a partial rupture occurred in the fourth month, which was completed at the seventh. Of the cases where rupture occurred in the seventh month (see summary), in only two was there any explanation for such early rupture; in No. 65, a bag was inserted for placenta prævia, and in No. 70 the placenta was implanted over the scar. Circumstances which should favour early rupture are implantation of the placenta

over the scar and retroplacental hæmorrhage, hydramnios, and operative manipulation; also excessive thinness of the scar, especially where there are gaps in the line of the scar merely closed by omental adhesions. In No. 48 the fœtus was post-mature and very large, and rupture was postponed until the eleventh month.

Moment of Rupture: during Pregnancy or during Labour.—It will be observed from the summary that in the eighty-four cases in which this point is stated, rupture occurred during labour in forty-eight and before the onset of labour in thirty-six. Of the former, rupture occurred early in the first stage in twenty-nine. This aspect of the subject is plain enough; a scar is much more strained during uterine contractions than during the quiescent period of pregnancy, and if labour be allowed to continue for a long time, especially if obstructed, the scar is subjected to an unwarrantable strain. A point worth bearing in mind is that for many patients who go into labour subsequently to a Cæsarean section, the labour is for all intents and purposes a primiparous one. At all events, a patient who has had labours previous to the operation is less likely to strain her scar and get a rupture than a patient whose operation was done when she was a primigravida. Other circumstances which obviously favour rupture during pregnancy and before the onset of labour pains are overdistension of the uterus and implantation of the placenta over the scar with retroplacental hæmorrhage; only a few examples of such will be found amongst the thirty-six reported cases, and it must be assumed that thin scars often yield under the influence of the normal intrauterine pressure. A sinister feature of rupture of Cæsarean section scars is that the accident may occur during pregnancy, and from the seventh month onwards. This makes it difficult for us, however forewarned by our knowledge of the risk run by the patient, to protect her completely from the consequences; we cannot very well keep her under close observation in a hospital or nursing home from the seventh month onwards, ready to operate at the first sign or symptom.

Cases with Absence of, or with very slight, Symptoms.—All are familiar with the usual signs of rupture of the uterus: sudden pain, collapse, signs of intraperitoneal bleeding, cessation of labour pains and the distinctive feeling of the fœtus and retracted uterus. The point about these cases of ruptured scar is that the signs and symptoms are often extremely slight and are not seldom absent altogether. The explanation is not far to seek; instead of the whole thickness of the uterine wall being torn through, only a membranous and avascular scar has yielded; instead of sudden rupture being determined by powerful and prolonged uterine action in an exhausted patient, the rupture often occurs quietly and

gradually during pregnancy or the early stage of labour. The membranous scar yields at one point, a small bag of membrane bulges through, and the patient goes into labour, as it were, through a gradually yielding scar until the ovum is born into the peritoneal cavity. The severity of the symptoms is naturally dependent on the position of the placenta. If the placenta is implanted over the scar hæmorrhage is likely to be very severe; if the placenta is well away from the scar, it separates and is expelled into the peritoneal cavity with very little more hæmorrhage than occurs after a normal third stage of labour. In cases in which the rupture is partial and the ovum is still in the uterus, acute symptoms are obviously not to be expected. In some cases a partial rupture, sometimes only a small perforation, has been quite unexpectedly discovered at a repeated Cæsarean section (see case abstracts Nos. 28, 33 and 56). If the placenta is over the scar,, even a small perforation may be accompanied by considerable intraperitoneal hæmorrhage, as in case abstract No. 93. Apart from the type of rupture (*i.e.*, whether complete or a mere perforation) the abstracts contain six cases where symptoms were absent (case abstracts Nos. 15, 24, 27, 40, 66 and 81) and fourteen in which they were slight (case abstracts Nos. 12, 14, 21, 22, 33, 35, 52, 56, 64, 79, 80, 83, 86 and 91). Three cases of complete rupture, accompanied by escape of the fœtus and placenta into the peritoneal cavity, with extremely slight and misleading symptoms may be quoted as examples. In Case No. 12 the absence of symptoms caused a mistake in diagnosis; there was no collapse, only a slight alteration in pulse tension and rate, and slight abdominal pain and tenderness. In Case No. 64 the only symptoms were a slight indefinite bearing-down pain and a feeling of weight in the lower abdomen, worse on standing. In Case No. 91 there was no intraperitoneal hæmorrhage or shock; there was diffuse abdominal pain for a few days, after which the patient was comparatively comfortable, walking about with little inconvenience.

On the Frequency of Rupture.

Upon this all-important point we possess, up to the present, no reliable information. A statement is often found that rupture of the scar follows Cæsarean section in 2 per cent. of cases. It has been of great interest to follow this tradition to its source; it was introduced by Couvelaire, quoting van Leuwen. I cannot get at van Leuwen's thesis (a Dutch one), and the summary he has published[1] is very confusing. To begin with, his method of estimating the percentage of ruptures was fallacious; he collected from literature all reports of cases of pregnancy following

1. *Annales de Gyn., et d'Obst.*, October, 1904.

Cæsarean section, including chiefly cases of repeated operation and ruptured scar. By comparing cases of rupture with cases of pregnancy that did not rupture, he calculated the percentage of rupture. Quite apart from the faulty method, the conclusions that have been drawn from his figures are inaccurate and confusing, as will be obvious to anyone who cares to read his published summary.

Harrar, reviewing the records of fifty repeated operations at the New York Lying-in Hospital, found two partial and two complete ruptures of the scar. Spalding states that, of forty patients who had Cæsarean section in his clinic or in his private practice, only one patient, to his knowledge, had had spontaneous labour later. This patient, after one spontaneous labour, got rupture of the scar in her next pregnancy (case abstract No. 64). Olshausen, in discussing Prüssmann's case (No. 16), said it was the only rupture out of at least 120 cases at his clinic. Jolly refers to his case (No. 50) as the third during the last thirty years at Olshausen's clinic. Asa B. Davis states that he had had only nine ruptured scars out of the 360 Cæsarean sections he had done (? personally). These figures, interesting as they may be, throw no light whatever on the frequency of ruptured Cæsarean section scars.

There is only one way of estimating this, by getting the subsequent obstetric history of a large number of Cæsarean section patients, and this forms the subject of Part III.

(III) The Results of a Follow-up Inquiry into the Subsequent History of a Series of Cæsarean Section Patients operated on between 1912 and 1918.

I wish first to draw attention to an elementary point which is often overlooked in referring to the frequency of rupture of the scar. The number of cases of ruptured scar compared to the total number of cases of Cæsarean section does not give the required information, for many Cæsarean section patients never have a subsequent pregnancy. It is necessary to know the number of cases of ruptured scar compared to the number of cases of subsequent pregnancy that advanced to, or near to, full term (*i.e.*, delivered by natural passages or repeated Cæsarean section; abortions not reckoned). There is only one way of finding out the frequency of ruptured scar; it is to get the subsequent obstetric history of a large number of Cæsarean section patients, over a definite period of years. I was, of course, especially concerned about the five cases of rupture at the London Hospital, and was anxious to find out what proportion these cases bore to the number of our Cæsarean section patients who subsequently became pregnant. This meant a follow-up inquiry. The difficulty was to decide how far back to

go in selecting a year for the beginning of the period of inquiry. It was useless to go too far back, as there would be a small chance of getting hold of patients who had their operation at too remote a date, in a class that changes its abode so often. I decided on the period 1912 to 1918. The results of this inquiry would give the frequency of ruptures at the London Hospital, but it would not give a reliable figure for the percentage of ruptures in general, for the London Hospital cases were only a small sample selected from the mass of cases throughout the country. Further, it was a special sample, in that it contained, without a shadow of doubt, a high proportion of cases of ruptured scar. A much larger and more mixed sample was necessary. So, to begin with, I decided to add to the London Hospital cases the cases from the City of London Maternity Hospital, taken over the same period; in the latter hospital there had been no case of ruptured scar. (The operations were performed by myself and my past and present colleagues at these two hospitals, viz.: Drs. Russell Andrews, Comyns Berkeley, H. Wlliiamson, the late Drummond Maxwell, Abernethy Willett, John Barris, Gordon Luker and Gordon Ley.) These combined figures work out as follows:—

Total number of Cæsarean section patients (excluding fatal and sterilized cases, and cases of repeated Cæsarean section where the first operation was performed prior to 1912)	112
Number followed up	84
Number in whom no subsequent pregnancy occurred	49
Number who subsequently became pregnant	35
Results of pregnancies:—	
Delivery by natural passages	10
Repeated Cæsarean section	15
Abortion	5
Pregnant now	4
Rupture of scar	5

These figures are depressing in the extreme; they show that five pregnancies out of thirty (*i.e.*, after deducting abortions and patients in the early months of pregnancy), or 16 per cent. resulted in rupture of the scar, and that there were half as many ruptures as deliveries by the natural passages. They further showed an unexpected degree of sterility following the operation.

Leaving now the main line of argument for a moment, I will refer to an objection which can be raised against these figures; it is that the follow-up failed in 25 per cent. of the patients, and that some of these patients may have become pregnant, and may have got ruptured scars, or have had spontaneous deliveries, or what not. My own conviction is that these patients either did not become pregnant or had early abortions. If they had been expecting

confinements they would almost certainly have sought the advice of their hospital, except in the few cases where they had left London. If all the patients had been successfully followed up the only result would have been the recording of a still higher percentage of sterility.

To return to the main argument, it was essential to take a much larger sample of cases than that taken from the London and City of London Maternity Hospitals if the figures were to be statistically reliable. As it seemed of such immense importance to get at the truth, I decided to try and get the results of Cæsarean sections done throughout the country during the same period. I, therefore, wrote to many obstetric surgeons in active hospital practice, asking them to collaborate with me in a collective investigation. This investigation has been a complete success, in that we are in possession of the subsequent obstetric history of 1,103 cases of Cæsarean section (including the London Hopital and City of London Maternity Hospital cases already referred to) performed between the years 1912 and 1918, inclusive.

Result of the Collective Investigation.

In Table I are displayed the number of cases and their sources, together with the number followed up, the number that subsequently became pregnant, and the mode of termination of the pregnancies. The suture material, as used in the total number of Cæsarean sections, is also shown. The table may be summarized as follows:—

Total number of Cæsarean section patients (excluding fatal and sterilized cases, and cases of repeated Cæsarean section where the first operation was performed prior to 1912)	1,605
Number followed up	1,103
Number in whom no subsequent pregnancy occurred	616
Number who subsequently became pregnant	487
Results of pregnancies:—	
Delivery by natural passages	78
Repeated Cæsarean section	352
Abortion	47
Pregnant now	86
Rupture of scar	18

(The discrepancy between the number of pregnancies and the number of patients who became pregnant is, of course, accounted for by the fact that some patients became pregnant more than once.)

A good many interesting points could be worked out from the lists of cases I have had sent me; for example, the sterility rate that follows Cæsarean section. But here I intend only to work out two, viz., the frequency of rupture and the suture material.

(The publication in full of the lists of cases will give anyone who so wishes the opportunity of working out other points, or for checking my own results.)[1]

The Frequency of Rupture.

Out of the 487 patients who became pregnant, eighteen (or 3.6 per cent.) got ruptured scars. This figure does not represent the true frequency of rupture; it is necessary to know the frequency of rupture amongst the pregnancies that went to, or near to, term and were therefore liable to ruptured scars.

TABLE I.

	Total patients	Followed up	No subsequent pregnancy	Subsequent pregnancy	Delivered natural passages	Repeated Cæsarean section	Abortions	Pregnant now	Rupture	Sutured with: Catgut	Sutured with: Silk	Sutured with: Silkworm gut
St. Mary's Manchester ...	243	190	96	94	4	79	13	21	1	188	1	—
Queen Charlotte's Hospital ...	175	88	49	39	8	24	5	7	—	3	70	8
Glasgow Royal Maternity and Women's Hospital	143	82	40	42	5	31	5	4	1	36	31	—
Liverpool Maternity Hospital	142	83	30	53	8	38	2	12	3	82	—	—
Jessop Hospital	128	105	64	41	8	37	3	2	4	84	30	—
Leeds Maternity Hospital ...	93	63	35	28	2	30	2	—	1	63	—	—
London Hospital	65	52	29	23	5	12	2	2	5	25	22	5
St. Bartholomew's Hospital ...	59	22	10	12	5	11	—	1	—	—	—	25
Guy's Hospital	57	45	18	27	7	13	3	6	—	45	—	—
Middlesex Hospital	56	36	22	14	4	10	3	2	1	21	14	—
Mr. F. Jordan	50	43	29	14	—	7	—	8	—	43	—	—
City of London Maternity Hospital	47	32	20	12	5	3	3	2	—	1	27	4
Edinburgh Maternity Hospital	46	38	27	11	1	8	—	3	—	12	27	—
General Lying-in Hospital, York Road	46	28	20	8	—	7	—	2	—	3	15	7
St. Thomas's Hospital ..	44	27	15	12	4	7	1	2	1	17	10	—
Leeds General Infirmary ...	41	38	22	16	5	12	1	3	—	38	—	—
Rotunda Hospital	40	28	14	14	4	6	—	5	1	2	27	—
Mr. E. Edge	36	25	15	10	1	7	1	1	—	25	—	—
Dr. B. Whitehouse	30	20	13	7	—	3	3	2	—	20	—	—
St. George's Hospital	16	14	13	1	—	1	—	—	—	—	—	14
Mr. C. Martin	15	15	13	2	—	2	—	—	—	12	3	—
Westminster Hospital	11	11	9	2	—	1	—	1	—	—	11	—
Dr. B. Solomons	8	5	4	1	—	1	—	—	—	5	—	—
Mr. Darwall Smith (private)	7	7	7	—	—	—	—	—	—	—	—	7
Women's Hospital, Birmingham	7	6	?	4	2	2	—	—	—	6	—	—
Total ...	1,605	1,103	616	487	78	352	47	86	18	731	288	70

1. The complete table made up of the lists of cases is published in the *Proc. Roy. Soc. of Med.*, 1920, vol. xiv (Obstet. and Gyn. Sect.), pp.

Adding together the repeated Cæsarean sections, the deliveries by the natural passages and the ruptured scars, we find they come to 448. The true frequency of rupture is eighteen in 448, or 4 per cent. It is also interesting to note that the proportion of ruptured scars to successful deliveries by the natural passages is 18 to 74, or 1 to 4.3.

The Suture Material.

Out of 1,089 Cæsarean sections in which the suture material is noted (see Table I), in 731 catgut was used, in 288 silk, and in seventy silkworm gut. In a few cases combined deep sutures of catgut and silk or silkworm gut were used; these have not been reckoned. The frequency with which these suture materials were used in general works out at 67 per cent. catgut, 26 per cent. silk, and 6 per cent. silkworm gut (incidence of catgut to silk equals 1 in $2\frac{1}{3}$).

In the cases of ruptured scar, catgut was used in fifteen cases, silk in two, and in one case there is no record of the suture material. In no case was silkworm gut used. The frequency with which the suture materials was used in cases of ruptured scar, works out at 88 per cent. catgut, 12 per cent. silk, 0 per cent. silkworm gut (incidence of catgut to silk equals 1 in 7). The number of silkworm gut cases is, of course, too small to draw conclusions from. It is thus apparent that the incidence of catgut to silk in cases of ruptured scar is nearly three times its incidence in Cæsarean section in general. From this it might be inferred that scars are nearly three times as liable to rupture after the use of catgut as after the use of silk.

But to this conclusion a reasonable objection may be raised; it may be urged that perhaps very few cases of pregnancy followed the use of silk compared to the number that followed catgut. For example, if only ten or twenty cases of advanced pregnancy, or labour, occurred amongst the silk cases, silk would come badly out of the ordeal, with two ruptures to its credit. This objection can quite easily be met and overcome. It is necessary to find out the proportion of ruptures to advanced pregnancies amongst the silk cases, and compare it to the proportion of ruptures to advanced pregnancies amongst the catgut cases. This information is set out in the following table:—

	Repeated Cæsarean section.	Delivery by Natural passages.	Rupture.	Total.
Catgut	237	49	15	301
Silk	72	19	2	93
Silkworm gut ..	15	6	0	21

This shows that fifteen ruptures occurred in 301 cases of advanced pregnancy (*i.e.*, repeated Cæsarean section, plus delivery by the natural passages plus rupture) after the use of catgut, a proportion of 1 in 20; and that two ruptures occurred in ninety-one cases after the use of silk, a proportion of 1 in 46.5. That is, about 2 per cent. of the silk cases, and 5 per cent. of the catgut cases were followed by rupture in subsequent pregnancy.

The liability to rupture after catgut is, therefore, nearly two and a half times the liability after silk.

Put in another way, if silk had been used instead of catgut in the above 301 catgut cases, and rupture had occurred in the same proportion as for the silk cases, there would have been only six ruptures instead of fifteen, and the total number of ruptures for all cases would have been reduced from seventeen to eight.

From the facts revealed by these figures, I have no hesitation in declaring catgut to be a dangerous suture material for Cæsarean section, and in asserting that henceforth it should be discarded.

In conclusion, I wish to tender my most sincere and heartfelt thanks to my fellow obstetric surgeons in the British Isles who have so generously responded to my call for a collective investigation. The collection of these lists has occasioned an immense amount of careful work to those who have undertaken the task. It is the utmost gratification to me, as I am sure it is to them, that our work has met with success, and has revealed so many outstanding facts about a subject which is of such great importance to us all.

Conclusions.

(1) The frequency of rupture of the Cæsarean section scar in subsequent pregnancy or labour (abortions excluded) is 4 per cent.

(2) The cause of ruptured scar is imperfect healing, leading to a thin scar in which muscular union has failed, and which consists of little more than peritoneum and decidua with a varying amount of intervening fibrous tissue.

(3) All thin scars stretch during pregnancy; rupture of a thin scar may be determined solely by the intra-uterine tension of normal pregnancy, or by the uterine contractions of normal labour; or it may be favoured by various accidental factors, of which the chief is insertion of the placenta over the scar, with partial separation of the placenta and retroplacental hæmorrhage.

(4) Other accidental factors are over-distension of the uterus, prolonged or obstructed labour, operative interference, such as internal version, the insertion of hydrostatic bags, and the administration of such drugs as pituitrin.

(5) In the reported cases rupture occurred almost as often during pregnancy as during labour (in proportion of three to four); and many cases have been reported as early as the seventh month of pregnancy.

(6) The chief cause of imperfect healing is infection of the uterine wound; other causes are imperfect methods of suture and the employment of unsuitable suture material.

(7) As regards the suture material, catgut should not be used, for the liability to rupture after catgut is two and a half times the liability after silk. For theoretical reasons silkworm gut is the most suitable material.

(8) As regards the incision, the scar of the transverse fundal incision is especially liable to rupture. Only one case has so far been reported of rupture of the scar of the cervical incision.

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Cæsarean Section in Infected Cases of Obstructed Labour.

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The procedure to be adopted when dealing with a case of obstructed labour actually varies with the condition present, and the antecedent events of the labour very often profoundly modify the situation. The so-called "septic" or "suspect" case is one which is regarded as perhaps the most difficult in which to come to a decision as to the proper course to adopt. If the child is alive when the management is undertaken, that fact alone should have due consideration paid to it.

An immediate Cæsarean section suggests itself at once as the simplest and quickest method of delivery, but authorities are much at variance as to the justification for such a course of action.

In Dr. Amand Routh's report, read at St. Petersburg, he found that a maternal mortality of 34.7 per cent. attended the operation when performed in cases in which infection might be presumed to have occurred before surgical methods were adopted for delivery.

This very high mortality has influenced obstetric opinion in this connection, and many authorities hold that Cæsarean section is either contra-indicated entirely or should be followed by some mutilating operation in order to minimize the risk of a fatal termination through sepsis.

I think that such a view is unnecessarily pessimistic, and that the danger is overrated, and put forward my own experience, which, though small, seems to me to justify the opinion I hold. I believe that, if the child is alive, the facts that the membranes have been long ruptured, that repeated examinations have been made, and that efforts at delivery have failed, should not be assumed to veto Cæsarean section as a means of delivery; and that by proper technique the operation can be completed with every chance of success. I also believe that the classical operation is the best and safest one to adopt in these circumstances.

The first case which helped me to rid myself of the unreasoning fear of the "septic" case was one which occurred in the hospital practice of Dr. Amand Routh when I was Registrar and Tutor at Charing Cross Hospital. The patient on admission presented the most unfavourable condition. She had been in labour 48 hours,

the membranes having ruptured early. There had been repeated attempts to deliver the child with forceps, and the woman's general condition was one of marked exhaustion. Her temperature was 101°F., and her pulse-rate was over 120. The child, however, was alive, and Dr. Routh decided to do a Cæsarean section. The convalescence was stormy, but both mother and child did well, and the patient has subsequently had other children.

This case made a great impression upon me, and the feeling that the "septic Cæsarean" is less dangerous than many of my colleagues believe has become deeper with increasing experience.

When dealing with such cases I always use a modified technique designed in order to minimize the risk of infection. Briefly, my procedure is as follows:—

The vulva and vaginal canal are first thoroughly swabbed out with antiseptic fluid. I have used iodine, perchloride of mercury, flavine and Milton; but the one I now rely upon is the "blue paint," first prepared at the Middlesex Hospital Laboratories. This swabbing is very thorough, and is done under anæsthesia. The abdomen is next painted with the same fluid. An incision is then made of sufficient length to permit of the easy eventration of the uterus. When this has been done a large towel is laid behind the organ and drawn forward around the cervix, so as to prevent, as far as possible, infection of the peritoneal cavity with the liquor amnii. After the child is delivered and the placenta and membranes have been removed, the whole of the interior of the uterus and the edges of the uterine wound are swabbed with the blue paint and the wound closed according to the classical method. Saline solution is now poured over the uterus, the towel carefully removed by the assistant, and the uterus returned to the abdomen; the abdominal wound is closed in layers without drainage.

With regard to the suture material used, I have in all cases employed linen thread or silk, but I feel that an even safer material would be silkwom gut, and propose to use it in future cases. An unabsorbable ligature is in my view essential in these cases.

It will be seen that many of the cases developed symptoms and signs of septic absorption after the operation, but the final result in all has been good; a considerable proportion show healing of the wound by first intention.

The following are the notes of the nine cases which I have done since March 1919. They can all be regarded as "suspect," and I think that the results justify the attitude which I have adopted with regard to the treatment of these cases:—

Case I. M. J. (Queen Charlotte's Hosp.), July 24, 1919. Primigravida, æt. 28. **Admitted to hospital at the request of her doctor as a case of**

obstructed labour. She had been in labour for two days and the membranes had ruptured 30 hours before admission. Frequent examinations had been made, but no attempt to deliver had been undertaken. The temperature was 98° F. and the pulse-rate 124. The uterus was very irritable, tightly moulded round the child and did not seem to relax to any extent. Cæsarean section was undertaken with antiseptic precautions, and a live child delivered which weighed 8 lbs. 8 ozs. The puerperium was entirely uneventful and the wound healed by first intention.

Case II. 30/19. A. B. Seen on 15th Nov., 1919, with the history that the membranes had ruptured on the morning of the 14th and that labour pains had been present for only four hours and had then ceased completely.

The child presented in the L.O.A. position, and the cervix admitted two fingers.

I advised quinine gr. v. and ¼ cc. of pituitrin four hours later, the latter to be repeated six-hourly.

On Nov. 19th meconium had been coming away for some hours and the fœtal heart-rate had, during the two hours before I saw the patient, dropped from 140 to 100. Pains had been infrequent and the cervix was about the same size as when first examined. The vaginal discharge was slightly offensive. As the parents were both desirous of a living child I advised an immediate Cæsarean. This was done and the baby delivered slightly asphyxiated. It soon recovered. The puerperium was uneventful except for the occurrence of some offensive vaginal discharge on the fourth and fifth days. The subsequent history of this patient is not without interest, as on March 27th of this year I delivered her of a full time child after a perfectly normal labour.

Case III. H. H. (Queen Charlotte's Hospital), Ap. 27, 1920. i-gravida, aged 41, married 19 years.

The labour began with rupture of the membranes, and after 96 hours very slow progress had been made. The cervix was dilated to about the size of one shilling, when the fœtal heart became irregular. The liquor amnii was slightly offensive and stained with meconium. The mother's temperature was 100° F. and her pulse-rate 110. As she was very anxious to have a living child I did a Cæsarean section after having explained the position to her, treating the case as "suspect."

The baby weighed 9 lbs. 2 ozs., and cried after a few moments' resuscitation. The puerperium was complicated by a temperature of 99° F., which lasted for five days. The wound healed *per primam*. The baby developed a slight broncho-pneumonia but recovered.

On discharge the pelvic condition appeared entirely normal.

Case IV. M. H. (Queen Charlotte's Hospital), Aug. 8, 1920. ii-gravida, aged 44. She was admitted as a case of obstructed labour at the request of her doctor, who stated that she had been in labour 16 hours and that he had twice attempted to deliver with forceps after manually rotating a posterior position of the vertex. On admission the patient was very exhausted, temperature 97° F. and pulse-rate 120. Examination showed the head high above the brim and fixed, the cervix three-quarters dilated, deeply torn posteriorly, and the vagina lacerated.

A Cæsarean section was done with the technique as described above, and a live baby delivered.

Subsequently the temperature oscillated about 99° F. for a fortnight, but the wound healed by first intention, and the pelvis appeared normal on examination at her discharge from hospital. The baby did well.

Case V. M. L. (Islington Maternity Home), Sept. 19, 1920. i-gravida, æt. 37. This patient had been in labour 56 hours when the operation was done, and two medical men had each endeavoured twice to deliver with forceps. The head was high above the pelvic brim and fixed, while the pains were very strong and occurring at intervals of three minutes. The vagina was much torn. The child was delivered asphyxiated but soon revived. It weighed 8 lbs.

The puerperium was febrile, the temperature being over 100° F. from the 6th to the 12th day, while the lochia were very offensive on the 9th and 10th days.

The wound healed by first intention, and uterus and adnexa appeared to be normal on her discharge from the Home.

Case VI. C. D. aged 24. i-gravida. Oct. 12, 1920. This patient was seen in consultation as a case of obstructed labour in which the membranes had been ruptured for 40 hours and two attempts at delivery with forceps had been made. The pelvis was generally contracted and the head was still above the pelvic brim in spite of many hours in labour. The patient was very anxious for a live baby, and after explanation of the circumstances to her and her husband a Cæsarean section was done with the usual precautions.

The child weighed 9 lbs. 10 ozs., and was rather deeply asphyxiated, but soon recovered. The puerperium was quite uneventful, and subsequent examination revealed no abnormality.

Case VII. F. B. (Queen Charlotte's Hospital), May 2, 1921. i-gravida, æt. 27. Labour began with rupture of the membranes on April 26th and the patient was admitted 96 hours later with fair first stage pains. On examination the head was found high and fixed and the cervix was dilated to the size of a florin. It was hoped that the head would mould sufficiently to come through the pelvic brim, but 34 hours later five applications of forceps were made without success. A Cæsarean section was done, the case being regarded as suspect, and a baby weighing 8 lbs. 12 ozs. was delivered alive and did well.

The puerperium was febrile from the 2nd to the 18th day, but there were no alarming constitutional symptoms. The wound healed at once and the pelvic condition on discharge was noted to be normal.

At the time of operation this patient's temperature was 101° F. and her pulse-rate 120.

Case VIII. M. G. (Queen Charlotte's Hospital), May 17, 1921. iii-gravida, æt. 39. The labour began on May 16, at 3 a.m., with the rupture of the membranes, and at 5 a.m. on May 17th, after repeated examinations, ineffectual attempts at delivery with forceps were made. The patient was sent to hospital, and on examination the vagina and cervix were found considerably torn, and the head, the major portion of which was still above

the brim, showed an enormous *caput succedaneum*. The temperature was 100.4° F. and the pulse-rate 96.

Cæsarean section was done 30 hours after rupture of the membranes and a live baby was delivered. This baby presented a generalized œdema and though it weighed 9 lbs. 6 ozs. it gradually lost weight and died on the 10th day.

The puerperium was febrile from the 8th to the 13th day during which time the patient had a thrombosis of the superficial veins of the left leg. The wound healed perfectly and the pelvic viscera were apparently normal on discharge.

Case IX. C. B. (Queen Charlotte's Hospital), July 13, 1921. This patient was admitted with a history that the membranes had been ruptured for 10 hours and that two separate attempts had been made to deliver with forceps. Her temperature was 100° F. and her pulse-rate 120.

Examination showed the head to be above the brim and fixed while the uterus was very closely applied to the baby. By vaginal examination it was found that the cervix was four-fifths dilated and torn. Three more trials were made with forceps to effect delivery, and I saw the case 12 hours after admission. The baby was still alive so I did a Cæsarean section with the technique employed in septic cases. The baby weighed 9 lbs. 2 ozs. and did well.

The puerperium was complicated by pyrexia from the 5th to the 11th day with a rigor at its onset and very offensive lochia throughout. A free discharge of pus from the lower end of the abdominal wound occurred on the 11th day after which progress was satisfactory.

Examination on discharge from hospital showed apparently normal conditions in the pelvis.

The Sterilisation of Infection incurred before Cæsarean Section is performed.

By Professor W. Blair Bell, B.S., M.D. (Lond.),

Gynæcological Surgeon, the Royal Infirmary, Liverpool

In the past judicious surgeons have refrained from performing Cæsarean section in cases sent for treatment after manipulations or frequent examinations. Such cases are often frankly infected or are what has been known as 'suspect.' It may truthfully be stated that in such circumstances thousands of infants have been sacrificed in the interest of the mothers, and that the many maternal lives that have been lost when Cæsarean section has been practised in the presence of infection have thrown a dark cloud on the statistics of this operation. It must, however, be remembered that in a considerable number of instances in which the death of the mother has followed section, the infection has been so serious that in all probability she would have died from puerperal infection of the placental site.

Drastic measures as Cæsarean hysterectomy may have saved lives, but, on the other hand, such a procedure has other risks which cannot be left out of account, quite apart from mere sentimental considerations.

All obstetricians have given this matter serious attention, but until last year no idea of value had suggested itself to me. In February 1920 I was asked to see a case of central placenta prævia in a multipara. She had been bleeding for some days and had lost a considerable amount of blood. The cervix admitted the tip of the index finger. Obviously, other things being equal, Cæsarean section was the correct treatment. But, even while disregarding the exsanguined condition of the patient, which could, if necessary, be corrected by transfusion, I was confronted with the fact that for some days two practitioners had made repeated daily examinations without wearing gloves. Nevertheless, I performed Cæsarean section and delivered a live child. After delivery of the placenta I applied a gauze pack soaked in a strong sodium hypochlorite solution (Milton fluid) to the edges of the uterine wound for a minute or two. The pack was then placed in the uterine cavity, one end being pushed with long forceps through the cervix into the vagina. The uterine incision was then closed. Subsequently, when the patient had been returned to bed, the pack was

withdrawn. An uninterrupted recovery followed without any rise of temperature above the normal.

Since that time I have employed this procedure in ten cases, not all of which were infected or even 'suspect' cases; but I intend to use the method as a more or less routine procedure, because it is very difficult to assert without previous bacteriological examination, which is not always possible, that any given case is safe from infection.

I have on a previous occasion referred to the value of this procedure.[1]

[1] *Proc. Roy. Soc Med.* (Obstet. and Gynæcol. Section), 1920, vol. xiv, p. 142.

Method of Suture of the Uterine Wound in Cæsarean Section.

By Professor W. Blair Bell, B.S., M.D. (Lond.).

While it is probable that faulty union of the uterine scar is due in a large majority of cases neither to the material used for suture nor to the method employed, but rather to infection, it is important that the technique of suturing should be as scientifically perfect as possible. The suture-material should, therefore, be slowly absorbable, and the sutures should be placed so as to be effective in securely approximating all parts of the thick muscle wall.

Tanned catgut will do all that silk can do in the matter of keeping the surfaces of the wound together until healing has been secured, and this material will not act as a nidus for organisms for any length of time, as may silk. I do not think this point is open to dispute in view of what has happened in connexion with the use of silk in other operations.

In regard to the closure of the wound accurate apposition of all parts must be secured. Some operators employ continuous sutures in several layers. This seems to me to increase the risk of subsequent gaping of the wound when retraction takes place; and the use of ordinary interrupted sutures does not prevent separation of the wound between the stitches (fig. 1).

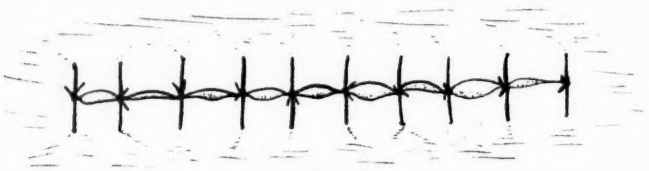


Fig. 1.

Gaping of uterine incision that may follow the use of interrupted sutures. Viewed from above.

A combination of both procedures should be safe, but it is unnecessarily complicated.

Since 1912 I have practised the following method of suture. It is one which I have for many years employed in procedures other than Cæsarean section. A Reverdin needle-holder with a *large* curved needle is used, and mattress-sutures are placed through the whole depth of the musculature on either side at close intervals throughout the entire length of the wound. The ends of these are left untied until the last has been passed when they are all knotted just tightly enough to bring the deeper parts in close contact (fig. 2).

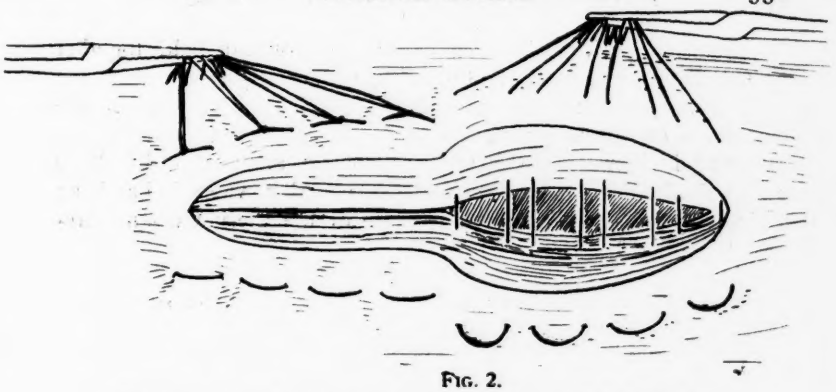


FIG. 2.

Mattress-sutures for closure of deep muscular layers of uterine incision Viewed from above.

The ends are left uncut, for the next stage consists of the closure of the now V-shaped superficial area. This is effected by using the long uncut ends of the mattress sutures which are brought through and over the superficial parts of the wound by means of the Reverdin needle, and again tied (fig. 3).

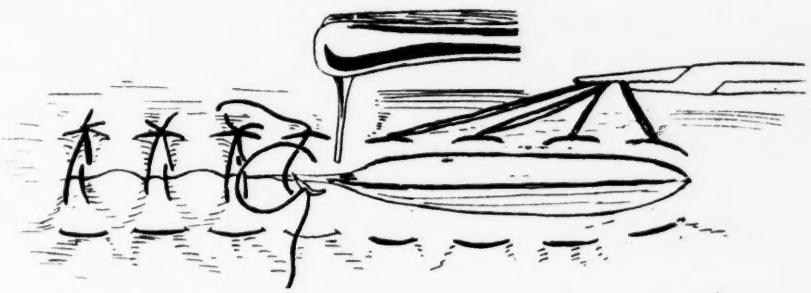


FIG. 3.

Overstitch for closure of superficial layers of musculature of uterine incision. Viewed from above.

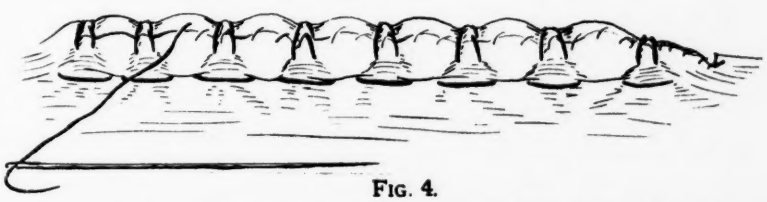


FIG. 4.

Buttress appearance of sutured uterine incision when viewed from the side and from above.
The final peritoneal suture is almost complete.

Last, the peritoneal edges of the incision are held together by means of a continuous suture of fine plain catgut (fig. 4).

I have practised this procedure, which I described in the discussion on Cæsarean section at the Royal Society of Medicine in 1920,[1] in between thirty and forty cases, some of which have been submitted to subsequent Cæsarean section, when it has been difficult or impossible to find the site of the uterine wound previously inflicted.

[1] *Proc. Roy. Soc. Med.* (Obstet. and Gynæcol. Section), 1920, vol. xiv, p. 143

The Suture of the Uterine Incision in Cæsarean Section.

By R. J. JOHNSTONE, B.A., M.B., B.Ch., R.U.I., F.R.C.S. (Eng.),
Professor of Gynæcology, Queen's University, Belfast.

THE method of suture which I have adopted in over 80 cases of Cæsarean section, while differing from that in general use, has at least the merit of being simple and rapid.

I use three tiers of continuous suture, as I believe that more perfect apposition can be obtained in this way than by the use of interrupted sutures, and that there is less risk of the formation of gaps in the line through retraction of the muscle between the points of suture. My first layer passes through the endometrium and holds its cut edges firmly together so as to prevent the intrusion of blood clot between them with the risk of the subsequent formation of pits along the line of union. Objection to the passage of sutures through the endometrium is based on false analogy. The Lembert method of suture is indicated when the mucous membrane to be dealt with is constantly bathed by infective material, as in the case of intestine, but may be discarded when we are dealing with a sterile mucous membrane such as that of the uterus. My second tier unites the thickness of the uterine muscle, and my third closes the peritoneum. I prefer the blanket stitch to the simple continuous. I have always used catgut, either Luken's or Merson's plain iodized.

In all the patients upon whom I have operated a second time the scar of the first section was practically indistinguishable from the surrounding uterine wall. Most of my colleagues in Belfast use this method, and so far I have only heard of one case of rupture in a subsequent pregnancy out of well over 100 cases.

The Administration of Anaesthetics in Cæsarean Section.

By Eric Gandy, O.B.E., M.R.C.S., L.R.C.P.,
Senior Anæsthetist to the Westminster Hospital and Anæsthetist to the Chelsea Hospital for Women.

We have at our command chloroform, ether, ethanesol, nitrous oxide, their mixtures and stovain.

Obstructed Labour.

A patient with contracted pelvis, which is the commonest indication for the operation, may also have a malformed thorax, and therefore perhaps a diminished respiratory capacity, cardiac embarrassment, or she may have tuberculous pulmonitis, or adherent pleura, these conditions therefore, if present, should influence the administrator to use either stovain, or gas and oxygen with local analgesia. Of these two methods gas and oxygen with local analgesia is the better and more convenient method.

Ante-partum Hæmorrhage.

The patient in such circumstances may have lost a quantity of blood and may therefore be in a very exhausted condition; and any method but gas and oxygen, aided by local analgesia, is contra-indicated.

Severe Toxæmias.

Chloroform has in the past been used to inhibit fits of eclampsia with success and apparently without harm to the patient, but eclampsia is a toxæmia, and chloroform a toxic poison. Eclampsia is a form of acidosis, and chloroform is also known to produce the condition known as acidosis. With the present knowledge that one has of the causes of the toxæmia of pregnancy and of the so-called post-chloroform poisoning, it is fair to assume that by the use of chloroform one is adding toxin to the already toxic patient, and for these reasons chloroform is certainly not the anæsthetic to administer. Ether, or gas and oxygen with ethanesal are much safer to both mother and child; but if the operation is prolonged it must be remembered that the fœtus *in utero* will not bear gas and oxygen with such impunity as will its mother. Also it must not be forgotten that the child will eliminate gas and oxygen and ethanesal from its system after removal from the uterus quicker

than it will ether. Experiments have been performed moreover on pregnant animals which go to prove that ether is the better of the two.

Preparation.

This should be the same as for any other obstetric or gynæcological operation, but stress may be laid on a few points. It is advisable to give only castor oil and to depend on this alone to clear the bowel, thus obviating the use of an enema. In cases of eclampsia, if there is time glucose may be administered by the rectum, or bicarbonate of soda may be given intravenously. Forty-five minutes before the operation atropin sulphate gr. $^1/_{80}$ or gr. $^1/_{100}$ in all cases should be given, but not scopolamine or morphia; these drugs affect the respiration of the child and difficulty will occur after the child is delivered from the uterus. If these narcotics be given at all they should be given at least six hours before the child is delivered. Ether or chloroform by oral administration has been suggested as a method of bringing the patient to the table in a somnolent condition, and having due regard to the nervousness of the patient, it is a method which might be remembered; the mother looks on the operation as unnatural, especially if she be a multipara; and everything that can be done to dispel fear should be adopted; but the writer's experience of this method in Cæsarean operations is so small that he cannot recommend it.

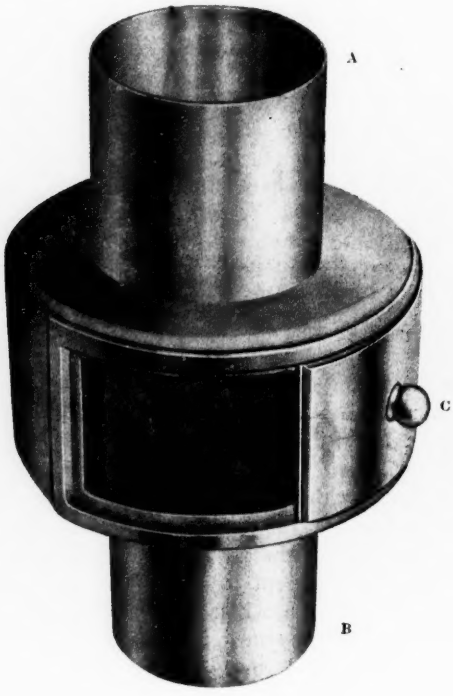
Posture.

The patient should lie on the table in any position she prefers and not made to lie on her back during the induction of the anæsthetic if she be uncomfortable in that position. The anæsthetist should stand at the side of the table during the induction of the anæsthetic, so that the patient should see him in a natural position, and not upside down, as is usually the case, when he stands at the head of the table. It is advisable to place a thick cushion under the waist of the patient to retain the arch of the back which sags to a flat condition when the back muscles are relaxed under surgical anæsthesia. Surgeons as a rule do not adopt the Trendelenburg position to any great degree, and this posture therefore does not call for any remark. The anæsthetist must remember that a lot of heat is lost to the patient after the removal of the child, and consequently she should be very well covered with hot blankets. Shivering fits immediately after delivery are common.

These appear to be small points but make for the patient's comfort.

Induction.

Before induction is started it is advisable for the anæsthetist to ascertain that the surgeon is in absolute readiness, because obviously the shorter the anæsthetic the safer it is for the child. When spinal analgesia is the method adopted, a little difficulty may be experienced by the adminstrator owing to the fact that it is very awkward for the patient to arch her back and bend her knees on to her abdomen, but it is imperative to secure this position for the needle must enter the canal quickly as the discomfort to the patient is very great, and with a little patient persuasion the anæsthetist will get what he wants. The induction of the usual inhalation anæsthetics in no way differs from anæsthesia for other operations.



A. Slieve fitting into Hewitt's Mixing Chamber.

B. Slieve fitting on to Face Mask.

C. Sliding door opening to admit of ethanesal or ether being poured on to the sponge.

Maintenance.

If by chance the anæsthetist has decided to use chloroform he should certainly change to ether when the uterus is incised and the baby removed, for there is no doubt that bleeding is less when ether is being administered than it is with chloroform. It is the

writer's experience that chloroform induces a flabby condition of the uterus, whereas with ether the uterus contracts more readily, and less blood escapes from the placental sinuses. When stovain has been administered it is interesting to note that despite the fact that the uterus is supplied by the pelvic plexus of nerves which receive twigs from the third and four sacral nerves, there is no interference with the contracting power of that organ, and as far as one knows there is no explanation of why stovain fails to inhibit the nerves of the uterus.

A very convenient form of giving a mixture of gas and oxygen with ethanesal or ether is by pouring two or three drachms of those drugs on to a sponge, after which the sponge is put into a small cylindrical vessel, as shown in the figure. This instrument is fixed between the mask and Hewitt's gas and oxygen mixing chamber. Its weight is small and its size is insignificant, so that the whole apparatus can easily be carried.

It should be remembered that when the child is delivered morphia hydrochloride gr. $\frac{1}{4}$ or gr. $\frac{1}{6}$ may be given at once.

There is little one need do for the comfort of the patient after the operation is terminated; she is nearly always quiet and restful.

When spinal analgesia has been the method adopted the greatest care should be exercised in carrying the patient back to bed. If it is incautiously done, and much shaking occurs, severe headaches, which sometimes last several days, may result. Also when in bed the patient should be placed in Fowler's position for the same reason.

Post-anæsthetic vomiting is, as a rule, not troublesome; and here it is interesting to mention that ethanesal is certainly more pleasant than ether for the patient to take, having regard to the fact that it does not cause suffering from nausea and the unpleasant clinging smell which ether produces, and, although sickness may occur, it is not quite so frequent with ethanesal as with ether.

In conclusion, we may say that it is very important that the anæsthetist should approach these cases with the very greatest care, in many cases Cæsarean operations are performed when the patient has been in labour some time and is perhaps very exhausted.

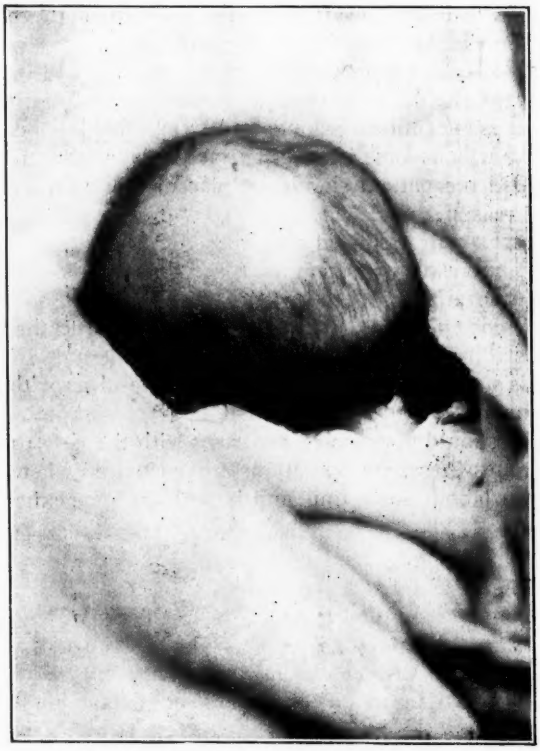
CLINICAL REPORTS.

Cæsarean Radical Hysterectomy following the Application of Radium.

By Comyns Berkeley, M.A., M.C., M.D. (Cantab.), F.R.C.P. (Lond.).

Senior Obstetric and Gynæcological Surgeon, the Middlesex Hospital; Senior Obstetric Surgeon, City of London Maternity Hospital; Surgeon, the Chelsea Hospital for Women.

E. B., age 34 years, a primigravida, was first seen in May 1914, complaining of irregular hæmorrhage and an offensive discharge since Feb. 1914. On examination the patient was found to be between six and seven months' pregnant, and there was an indurated ulcer on the posterior lip of the cervix uteri. The anterior lip was soft and not affected, and the mobility of the uterus was a little impaired.



Photograph of the head of the child at birth showing bald patch due to the action of the radium.

Under anæsthesia a section of the ulcer was removed, and the pathologist reported that the condition was one of squamous-celled carcinoma.

The patient and her husband, realizing that this pregnancy must be the first and last, were most anxious to have a child which should have every chance of surviving its birth, and after the nature of the growth and its attendant risks had been fully explained to them, they elected to allow the pregnancy to continue and meantime to have the growth treated by radium.

On May 28th, 232 mg. of radium bromide were inserted into the ulcer and surrounding tissue and left there for eight hours. Three weeks later, on June 18, a second application of 232 mg. of radium bromide was made for eight hours. The growth at the second operation was found to have decreased in size and showed sclerosis, and the uterus was more mobile.

On August 8th Cæsarean section was performed, followed by a radical hysterectomy.

The mother made an uneventful recovery, and was last seen in September 1921, in perfect health and with no signs of recurrence, 7 years and 5 months after the operation.

The child on delivery had two bald patches on its head corresponding to the position the radium had occupied in the cervix. One month later there was evidence of commencing growth of hair, and one year from the date of delivery the bald patches had disappeared. The child is alive and in perfect health to-day.

Cæsarean Section for Aortic Stenosis and Incomptence with Mitral Stenosis and Incompetence.

By Comyns Berkeley, M.A., M.C., M.D. (Cantab.), F.R.C.P. (Lond.).

C. H., age 21, a primgravida, was brought to me by Dr. E. S. Abraham for an opinion as to whether, considering the state of her heart, the pregnancy, which was of seven months duration, should be allowed to continue.

During childhood the patient had "growing pains" and a slight attack of influenza. When 10 years of age, pallor, languor and weakness (not dyspnœa) being noticed, a doctor was consulted, and a diagnosis was made of valvular disease of the heart. The patient was kept in bed for two years, and improved very greatly, and since then has lived a very quiet life. Before her marriage the patient was

in business, sitting down practically all the time during the hours from 10 a.m. to 5.30 p.m. Formerly there was some nausea with occasional vomiting, the first and last attacks being very severe and accompanied by rigors. The patient has recently felt rather tired towards mid-day, and has had shortness of breath and palpitation when walking quickly on the level and very soon tires on physical exertion.

The first time the patient consulted Dr. Abraham she was seized with an attack of palpitation and dyspnœa lasting about three-quarters of an hour, at the end of which she had to be taken to her home, some 200 yards away, in a cab.

When I first saw the patient her ankles and feet were swollen. She was somewhat breathless and could only move about slowly. I advised that the opinion of a cardiac specialist should be taken as to whether pregnancy should be allowed to continue, because the parents were most anxious to have a child that would survive its birth.

Report by Frederick W. Price, M.D. (Edin.), M.R.C.P., Physician, Great Northern Central Hospital; Physician, National Hospital for Diseases of the Heart.

On examination: Pulse-rate 94 per minute, moderately small, and not collapsing in character; no evidence of thickening of wall of radial artery, but that of brachial rather so; systolic blood-pressure very much below normal, being 90 mm.; a systolic thrill in the aortic area; force of apex beat moderately increased; on percussion, left border of heart just outside nipple line; in the aortic area, a systolic murmur, propagated to the vessels of the neck; along the left border of the sternum, and to a less extent over the base, a diastolic murmur; at the apex, a pre-systolic murmur, not at all rough in character, and a systolic, the latter being propagated to the axilla; urine has S.G. of 1010 and no albumen. On screening heart, left border $\frac{1}{4}$ in. outside nipple line, and transverse measurement of organ $6\frac{3}{4}$ in.—thus, considering her age and build, much enlarged; the aorta is not dilated, transverse measurement of shadow being $2\frac{1}{2}$ in. An electro-cardiogram shows a few extra-systoles, the deflection P in leads 1 and 2 is rather increased in amplitude, but is not broad or has not a flat top, and is not bifurcated, and the deflection T in lead 3 is inverted. The P — R internal is not increased.

Diagnosis: Aortic stenosis and incompetence, and mitral stenosis and incompetence.

After careful consideration, I am of the opinion that the pregnancy may be allowed to continue.

A month later Dr. Abraham was sent for twice during the night for attacks of palpitation, the second one being very severe, the patient feeling very faint. There was great dyspnœa, and the pulse was very feeble and its rate rapid. The patient's condition became so bad that she had to have a nurse and remain in bed or on a deck-chair, for on the slightest exertion she had an attack of palpitation.

In view of the condition of the patient I came to the conclusion that to allow her, a primigravida, to go through labour would be very dangerous, and, as she was approaching the fortieth week of pregnancy, I decided to deliver the child by Cæsarean section.

The patient took the anæsthetic, ether, administered by Mr. F. S. Rood, without any trouble, and did not give him the least anxiety. Assisted by Dr. Abraham, I delivered the child by Cæsarean section and removed both the Fallopian tubes.

The convalescence was uneventful, the attacks of palpitation and dyspnœa subsided, and the patient left the Home with her child three weeks later.

Cæsarean Section for Toxæmia of Pregnancy—Contracted Pelvis, Hydramnios and Triplets.

By Hubert Roberts, M.D. (Lond.), F.R.C.P., F.R.C.S. (Eng.).
Physician Queen Charlotte's Hospital; Physician Samaritan Hosp.

The patient was 37 years of age. Her first child was born dead after a difficult forceps delivery, and her second child, occipito-posterior, was delivered by forceps, and is now aged six and an idiot. I first saw the case in August 1921, and diagnosed twins. Her pelvis was contracted, the true conjugate diameter being estimated at $3\frac{1}{4}$ inches, also the bi-spinal 9 inches and bi-cristal $10\frac{1}{2}$ inches. In view of the history of the former labours I advised Cæsarean section at term.

On October 28th I was informed by her doctor that the patient was very distressed, was suffering from dyspnœa, that she was very big and that her legs were very swollen.

On November 15 I was called to see the patient, who was about 37 weeks pregnant. She was very distended, and had already passed a large amount of liquor amnii which had escaped from the hydramniotic sac of the first child. Her temperature was 101.2 F., her pulse-rate 100. She was very sick, complained of headache, and "did not know where she was." For the last 24 hours there

had been almost complete suppression of urine, the last specimen being solid with albumen.

I decided in view of all the circumstances to perform Cæsarean section at once. The operation was simple and to the surprise of all present the uterus contained triplets, a male weighing $3\frac{1}{2}$ pounds, and two females, one $3\frac{1}{2}$ pounds and the other $3\frac{1}{4}$ pounds. There was a great deal of liquor amnii and the large placenta was difficult to remove. The uterus retracted well with pituitrin.

On Dec. 12th the mother and children were doing well, the boy has gained 21 ounces in weight, and the girls 12 and 8 ounces.

The placenta consisted of a large lobe with an amniotic sac, the male child being attached by a big umbilical cord, and two smaller lobes fused, with two amniotic sacs and one chorion, to which the female children were attached.

Cæsarean Section for Excessive Prolongation of Pregnancy.

By Professor W. E. Fothergill, M.A., B.Sc., M.D. (Edin.),

Honorary Gynæcological Surgeon, Manchester Royal Infirmary; Honorary Surgeon, St. Mary's Hospital for Women, Manchester.

Early in February 1917, I was consulted by a young woman, aged 30 (Mrs. H.), who was then pregnant for the first time and was anxious because her baby, which was expected in December 1916, had not yet arrived. There had been no previous pregnancy. Menstruation began at 15; 28-day type; 3 to 5 days' duration. It was perfectly regular—"never a day late." The last period was in early March 1916, and was normal. Coitus was stated to have occurred on March 14, 1916, but not subsequently.

The patient was a short, dark Irish woman, very muscular. Her breasts were full of milk. The abdomen was very prominent and had very thick, tense, firm, muscular walls. The abdominal cavity was filled to distension by the uterus, which extended right up to the costal margin. The external measurements of the bony pelvis were normal. The vagina and cervix were in the condition characteristic of normal full-time pregnancy. The pelvic canal was narrowed by the excessive muscularity of the soft parts. The psoas and obturator muscles bulged into the pelvis: the muscular and fascial elements of the pelvic diaphragm being unduly large and strong, and the perineum prominent and thick.

There was no presenting part of the fœtus to be felt on vaginal examination, the cervix being high up while the large lower pole of the uterus hardly bulged into the pelvic brim.

Doubting the accuracy of the patient's statements I saw her with her husband later. They are both visionaries and enthusiasts, strict adherents of some narrow creed which views the reproductive function with stern utilitarian eye, and forbids coitus during pregnancy. They told me that after March 14th the husband was away for some weeks. On returning he found that his wife had missed a period, and took it that pregnancy had begun. Therefore no further intercourse had occurred. These people were obviously sincere, they had no object in deceiving me, and both were intensely anxious for a living child.

This was on February 11th, 1917—334 days after the last coitus and more after the last menstruation. The abdomen felt as if it contained a huge fibroid, nothing could be made out. There were no fœtal movements, but fœtal heart sounds were audible below the navel on the left side.

Torn between the desire to see what would happen and anxiety to secure a living child and to relieve the patient's distress, I temporized until February 21st—344 days from the last coitus. Then, feeling sure that no overdue child could pass safely through an unstretched and over-developed pelvic floor, I opened the abdomen and delivered—*horribile visu*—an anencephalic monster. It weighed 10½ pounds, and as the head was hardly worth mention, it follows that the body was of very considerable dimensions.

On October 22, 1918, Mrs. H. consulted me again. She had been in good health since the operation and had menstruated regularly up to January 28—February 2, 1918.

Coitus took place on February 11, 1918, for the last time. She therefore "expected" during the first week in November.

The physical signs were those of a normal pregnancy near term, the child being large, the position L.O.A., and the head well engaged in the pelvis.

The patient was very anxious to go through the process of labour "for the sake of the experience" as she said. But there was a scar in the uterine wall and the pelvic floor was still that of a primigravida. I therefore insisted upon a second Cæsarean section. This was done on November 11, 1918. A very fine child, weighing 10½ lbs., was delivered, and both left hospital in due season. At the operation, the uterine scar was found to be quite sound. The abdominal wall, also, was very strong, the recti being in contact in the middle line of the body—no linea alba.

The questions with which the obstetrician was faced in this case were, first, when a pregnancy in a primigravida has gone on for 344 days should one interfere or should one leave well alone? Next, supposing that interference is decided on, should it be

Cæsarean section or induction of labour followed by delivery, dead or alive, per *vias naturales?*

Again, presuming that a definite diagnosis of " monster " had been made, how should this have affected the decision of the previous questions? I should like to hear these points argued, as I am by no means sure that the course actually taken was the best.

As for the second pregnancy, I have no doubt that in a woman with a large child, a scar in the uterus and a parturient canal that has never been dilated, a prearranged Cæsarean section is the proper method of delivery.

I should like to mention one point in technique. Whatever be the method preferred for opening the uterus, I consider it worth while to spend a little time and trouble in opening the sheaths of both recti muscles throughout the length of the mid-line incision through the abdominal wall. If this is done at the beginning of the operation any bleeding it may cause has ceased before the end, and the cut edges of the fascia can easily be seen and united. When this is done the recti fall together and lie in direct contact with one another, and they unite, muscle to muscle, leaving no gap in the middle line of the abdominal wall. There is no injury to the blood supply of the muscles and the patient is left with a better parietes than that possessed by the ordinary parous woman. This method is good in all abdominal sections in which a mid-line incision will serve; but it is specially useful in Cæsarean section on account of the separation of the recti and stretching of all the elements of the abdominal wall characteristic of pregnancy.

Death from Post-partum Hæmorrhage after Cæsarean Section.

By Ewen J. Maclean, M.D. (Ed.), M.R.C.P. (Lond.), F.R.S. (Ed.),
Senior Gynæcologist, King Edward VII Hospital, Cardiff.

The patient, Mrs. C., æt. 30, a primigravida, was admitted to the obstetrical department of King Edward VII Hospital, Cardiff, on August 23rd, 1921, having been in labour since 9 a.m. on August 21st. Forceps had been unsuccessfully applied twice by the practitioner in attendance.

The maternal pelvis was flat, the measurements being:—Interspinous 21.5 cm. ($8\frac{1}{2}$ ins.); intercristal 22.0 cm. ($8\frac{5}{8}$ ins.); external conjugate 17.5 cm. ($6\frac{7}{8}$ ins.); diagonal conjugate 9.5 cm. ($3\frac{3}{4}$ ins.).

It was evident that the labour was obstructed. The abdomen was pendulous and the position first vertex. Through the three-quarters dilated cervix the fœtal head was felt to be with difficulty

movable above the pelvic brim. The fœtal heart was heard below and to the left of the umbilicus, beating 130 per minute. The patient was very exhausted, with a pulse-rate of 115 per minute, and the uterine contractions were feeble. As the outlook was very problematical whatever treatment was instituted, after a full consideration of all the aspects of the case, it was decided that Cæsarean section met the combined interests of mother and child in the best available manner. After the patient had had a few hours rest Cæsarean section was performed at 5.30 p.m., *i.e.*, 44½ hours after the onset of labour. The uterus having been eventrated and longitudinally incised, a small amount of stinking and discoloured liquor amnii escaped and the child was rapidly extracted. It was noticeable that after the membranes had been removed the uterus reacted very imperfectly to hot cloth and manual stimulation, and showed a continual tendency to relax : in a short time, however, the retraction was sufficiently satisfactory to warrant the abdomen being closed and the operation being completed. 1ccm. of pituitrin was administered hypodermically during the operation. During the operation the mother became very pale and perspiration broke out on the face : she required little anæsthetic and the pulse became very soft and registered 150 per minute.

On delivery the child was very limp and was not breathing, but after resuscitation-methods had been applied it cried lustily. The cephalic moulding was exaggerated.

When the patient was in the ward the foot of the bed was elevated, and she was surrounded by guarded hot water bottles and a stimulant was given. The pulse-rate was then 134 per minute and the uterus satisfactorily retracted.

At first the patient improved in general appearance, the pulse registered 110 per minute and was of better volume and the body surface became warmer. Suddenly, however, about an hour after the operation the uterus relaxed, dilated acutely, and before any efficient help could be available a profuse post-partum hæmorrhage occurred, drenching the bed and causing the almost instantaneous death of the patient.

In retrospect the view may well be entertained that had podalic version been attempted and found practicable the issue would have been a better expectation for the life of the mother, probably at the cost of the life of the child, and this line of treatment would have been adopted had there been evidence that, as the event proved, the liquor amnii was infected.

The clinical feature of prominent interest, however, was the sudden death from primary post-partum hæmorrhage, a complication which, fortunately, is rare. The secondary uterine inertia and the uterine infection were, no doubt, the main contributory causes.

Cæsarean Section performed for a slightly contracted Pelvis combined with a Recto-Vaginal Fistula.

By William Fletcher Shaw, M.D., Ch.B. (Vict.),

Lecturer in Gynæcology and Obstetrics, Manchester University; Hon. Assist. Gynæcologist, Manchester Royal Infirmary; Senior Hon. Assist. Surgeon for Women, St. Mary's Hospital, Manchester.

Until a few years ago Cæsarean section was confined almost entirely to cases of badly contracted pelvis in which a living child could not be born *per vias naturales*, but now that the indications for the operation are broadening more and more the following case is of interest.

Mrs. B. came to St. Mary's Hospital in 1915 with a history of having had one full time child, delivered dead with instruments, and from that time had noticed a slight amount of fæcal matter passing from her vagina.

When first seen she was about 8 months' pregnant. The pelvis was slightly contracted and she had a small recto-vaginal fistula in the lower third of the vagina which allowed the passage of a small quantity of fæces into the vagina. The contraction of the pelvis was only slight, and but for the recto-vaginal fistula I should have advised delivery by the ordinary passages allowing the head plenty of time for moulding, and then, probably, delivering with forceps. I think a living child could have been obtained by this method, but in all probability a high forceps delivery would have been necessary, and this through a passage the lower part of which was contaminated with fæces and, no matter how much care was exercised at the time, it would have been almost impossible not to carry some of this fæcal matter into the uterus with the examining hand.

As the patient was so far advanced in pregnancy it was useless to attempt to close this fistula as the tissues would certainly have given way during the labour if not before.

The other alternative was to do a Cæsarean section as this would eliminate all vaginal interference and all risk of pushing fæces into the uterus, and it was decided to carry this out at full time.

Cæsarean section was performed at St. Mary's Hospital on November 25, 1915.

It was a perfectly straightforward case and both mother and child made an uneventful recovery.

The interest in this case is the fact that Cæsarean section was performed for a recto-vaginal fistula combined with slight flatten-

ing of the pelvis, neither of which conditions would have been sufficient in itself to have necessitated the operation, but in combination were sufficiently serious to make delivery by the ordinary passages one of great risk.

Cæsarean Section for the Seventh Time; Uterus sutured with catgut on each occasion.

By William Fletcher Shaw, M.D., Ch.B. (Vict.).

One of the chief points raised in the discussion on Cæsarean section in London in 1919 was the best suture material to employ in suturing up the uterus.

Eardley Holland, from the study of the figures he collected from all parts of the country, was strongly of opinion that silk should be used and that catgut was unsafe, and this opinion was endorsed by many speakers, but on this point there is room for considerable difference of opinion.

In St. Mary's Hospital, in Manchester, we have used catgut for many years as the suture material for the uterus in Cæsarean section, and still continue to do so as we have seen nothing to shake our faith in it, and do not find it produces the alleged weak uterine scars prone to rupture, but strong firm scars which stand the strain of subsequent pregnancies without giving rise to any anxiety.

The following case is worth recording from this point of view alone:—

E.K. saw me at St. Mary's Hospital in 1919. She had a flattened pelvis with a diagonal conjugate of $3\frac{1}{2}$ inches, and gave a history of six previous Cæsarean sections, four of them performed by the late Dr. Walter and two by the late Dr. W. K. Walls, and when I saw her she was advanced in pregnancy for the seventh time.

There had been no difficulty with the previous operations, and this seventh pregnancy advanced quite normally to full time. Labour pains commenced a few days before the calculated date, and the patient had severe uterine contraction for three hours before Cæsarean section could be performed, but in spite of this the site of the uterine scar was thick and strong and showed no signs of stretching.

The operation was uncomplicated, and a living female child delivered, but as the patient expressed a wish to be sterilized this was done by excising a portion of each of the Fallopian tubes.

Both mother and child made an uninterrupted recovery.

Cæsarean Section performed on Six occasions on the same patient.

By Professor R. P. RANKEN LYLE, M.D., B.Ch. (Dur.),
Gynæcologist, Royal Victoria University; Obstetric Physician, Newcastle-on-Tyne Maternity Hospital.

Mrs. A. H., age 21, was admitted to the Royal Victoria Infirmary, Newcastle-on-Tyne, on the 30th September 1913, for Cæsarean section. She had a history of rickets in early childhood, was of stunted growth, and her true conjugate diameter was less than 3 inches.

1st Cæsarean.—Operation, 6th October 1913. Male, alive. Puerperium afebrile. Discharged 18th October 1913.

2nd Cæsarean. Admitted 20th February 1915. Operation 21st February 1915. Female, alive, 6½ lbs. Puerperium afebrile. Discharged 6th March 1915.

3rd Cæsarean. Admitted 3rd October 1916. Operation 3rd Oct. 1916. Female, alive, 5½ lbs. Discharged 17th October 1916. Temperature 100° F. on 4th day, 101° F. on 5th day after operation. Otherwise normal. This child died one year and seven months later. Four months after this operation the patient developed a ventral hernia, for which she was operated on 25th August 1917, and discharged 14th September 1917. Convalescence afebrile.

4th Cæsarean. Admitted 22nd March 1918. Operation, 22nd March 1918. Female, alive, 6¼ lbs. Puerperium afebrile. Discharged 13th April 1918. This child died ten weeks later.

5th Cæsarean. Admitted 15th September 1919. Operation, 16th September, 1919. Patient seven months' pregnant and in labour. Female, alive, but died the following day. Puerperium afebrile. Discharged 27th September 1919.

At this operation the lower part of the previous incision appeared to have given way, but was covered by peritoneum, forming a hernia of the uterus, about the size of a crown piece, into which the membranes protruded and through which the fœtus was quite visible when the abdomen was opened. The margins of this were cut away, and the uterine muscle sewn together again.

6th Cæsarean. Admitted 19th July 1921. Operation, 19th July 1921. The uterine wall appeared strong and healthy. Male child, alive, 7 lbs. Convalescence afebrile. Discharged 29th July 1921.

Although this patient has already had six Cæsarean sections, she does not seem any the worse. The method of procedure was similar in all cases. The operation was not performed until the

patient had been one or more hours in labour. The incision was a mesial one through the body of the uterus, and the uterine wound was united by two layers of chromic catgut, the first layer being interrupted through the whole thickness of the uterus, the second being continuous through the peritoneum over the incision.

The patient has now three living children, and her present age is 29 years. All these operations were performed in the Royal Victoria Infirmary, Newcastle-upon-Tyne.

A Case of Missed Labour: Cæsarean Section.

By Bellingham Smith, F.R.C.S. (Eng.).
Obstetric Surgeon, Guy's Hospital.

E.F., 22, was admitted to Victoria Ward, Guy's Hospital, on May 1st, 1913. She had been married 18 months and had had no children. She stated that menstruation had been regular up till May 24th, 1912, when it ceased. She had considered herself pregnant, and calculated that she would be confined at the end of Feb. 1913. On Oct. 2nd, 1912, she first appreciated fœtal movements and noticed that her abdomen was becoming progressively bigger and that her breasts were enlarged. On March 9th she sent for her doctor. The doctor wrote as follows: "On March 9th she seemed to be not quite at full time for there was a fairly long cervix which only admitted the extreme tip of my finger. I advised patience. On March 18th I saw her again and the cervix was gone (practically). There was a slight 'show,' and the fœtal head was obviously presenting as I could distinguish the sutures. On April 12th there was again a slight 'show.' There has never been any suspicion of a miscarriage."

The Registrar noted:—There is a median swelling in the abdomen which extends half-way from the umbilicus to the ensiform cartilage. The round ligaments can be distinguished on either side. During the abdominal examination the uterus appeared to make some slight contraction. No fœtal heart was heard, but a definite uterine souffle was audible on either side. On vaginal examination the cervix was soft, but was not dilated. The fœtal head could easily be felt. The breasts were enlarged and secreting, but the patient said that the character of the secretion had altered: "before it was watery, now it is milky."

Fœtal movements suddenly stopped on March 28th, and the patient said that she felt better in general health since the movements ceased. The abdomen had been decreasing in size since that date.

The woman felt perfectly well and did not feel inconvenienced in any way. Pulse and temperature normal. Urine normal.

Mr. Bellingham Smith discussed the possibility of inducing labour, and considered that the uterus was unlikely to react. Cæsarean section was decided upon. Diagnosis, "*Missed labour.*" Operation on May 9th, 1913; under open ether the usual conservative Cæsarean section was performed. On the uterus being incised about an ounce of "turbid purulent-looking fluid escaped." Bacteriological examination of swabs taken of this fluid was negative. A macerated fœtus was removed. Weight 5 lbs. 2 ozs. The placenta peeled off the interior of the uterus easily and without hæmorrhage. The wall of the uterus looked healthy.

The patient made a good recovery.

Notes on the Case.

An examination of the fœtus did not leave any doubt that it was full-time. The uterus was contracted down firmly on it and the child was tightly compressed. No doubt it had lost fluid, the liquor amnii being practically absorbed. It is difficult to say when labour was due. The estimated date was at the end of February, but apparently the first sign was a show on March 18th at which time the cervix was found to be completely flattened out. Beyond a show a month later, on April 12th, there was no other sign of labour. The patient states that movements ceased on March 28th and that from that time there was a progressive decrease in the size of the abdomen. I think it probable that labour was due about the end of February and that the child survived in the uterus for another four weeks.

Diagnosis was not certain. The uterus was so firm that apart from the history it might have contained a fibromyoma. No parts of the fœtus were recognizable on abdominal palpation. Assuming from the history that a pregnancy had occurred, there was again the possibility that this was extra-uterine or had occurred in a horn occluded below. It was only on operation that the diagnosis of an intra-uterine pregnancy with a missed labour was made a certainty.

Cæsarean Section for Thoracopagous Twins.

By R. J. Johnstone, M.B., R.U.I., F.R.C.S. (Eng.).

Mrs. T., aged 33, had had four children. The medical attendant on seeing the patient found two right feet presenting, and on examination recognised the band uniting the twins. Forcible traction failing to deliver the monster the patient was removed to hospital for operation. The twins were united from the top of the sternum to the navel. The mother recovered, the monster was dead.

Cæsarean Section for Advanced Rectal Cancer.

By R. J. Johnstone, M.B., R.U.I., F.R.C.S. (Eng.).

Mrs. J., aged 25, had had four children. Colostomy for inoperable rectal cancer had been performed ten months previously. The growth had invaded the recto-vaginal septum and a fungating mass blocked the lumen of the vagina. The patient was weak and emaciated, and labour had been in progress for three hours before operation. The child survived 15 hours, the mother 14 days. At the post-mortem the abdominal wound was sound in spite of the colostomy opening, but the vagina was filled by a sloughing mass of cancer, from which septic infection had spread upwards to the uterine cavity, the uterine wound had given way, general peritonitis had followed and was evidently the cause of death.

Cæsarean Section for Incontinence of Urine.

By Gordon Luker, M.D., B.Ch. (Cantab.), F.R.C.S. (Edin.),
Assistant Obstetric Surgeon, The London Hospital.

N.B., aged 27, 1-para. Had a still-born child delivered after cephalotripsy in October 1919. Since then she has suffered from constant dribbling of urine, though she was able to exert a certain amount of voluntary control over the bladder.

This incontinence apparently resulted partly from bruising of the urethra and neck of the bladder during delivery, and partly from a very extensive laceration of the vestibule involving the orifice of the urethra. No fistula was present nor was there any vaginal prolapse.

The external measurements of the pelvis were: interspinous, ten inches; intercristal ten and a half inches. The diagonal conjugate measured just over four inches.

The patient was examined by me April 22nd, 1921, being then thirty-seven weeks' pregnant. The head could just be made to engage, and in an ordinary case I should have advised a test labour in hospital. Against this, however, was the risk to the child, the possibility of forceps delivery and further damage to the urinary apparatus, and the risk of sepsis during labour and the puerperium by the constant dribbling of the urine into the vagina.

The patient herself, after her previous experience, was very anxious that the fœtus should be submitted to no risk and that if possible no further damage to the urethra should occur during labour; in fact she was very anxious to have Cæsarean section

performed. The operation was performed on May 10th, the day before labour was due, as a set operation.

The uterine incision was made transversely through the lower segment. There was a little bleeding from the ends of the incision where the more vascular lateral parts of the uterus were reached. The wound was closed by one continuous suture of buried silk, and one continuous suture of catgut.

A living male child weighing seven pounds was delivered, and the patient made an uninterrupted recovery.

Cæsarean Section for Graves' Disease and Contracted Pelvis.

By Gordon Luker, M.D., B.Ch. (Cantab.), F.R.C.S. (Edin.).
Assistant Obstetric Physician, London Hospital.

M. C., aged 27, primigravida; was admitted to Crossman ward, the London Hospital, on November 8th, 1920.

The history was that four years previously she had been in Yarrow ward with typical Graves' disease. Since then each year she had had a bad attack lasting two to three weeks.

In August 1920, she had again been in hospital with a relapse, and was then found to be six months' pregnant. On October 20th she had been seen at the Ante-natal department by Mr. Eardley Holland, who found that in addition to moderate symptoms and signs of Graves' disease, she had a flat pelvis. The diagonal conjugate measured four inches, the head was floating and seemed to be too large for induction of labour to have a reasonable chance of success.

It was thought that Cæsarean section, after suitable preparation of the patient, was preferable to the stress of a long and tedious labour.

The patient was admitted on November 8th. She was ill-nourished and very easily excited but otherwise apathetic, and the mental condition seemed altogether strange. Exophthalmos was marked, and tremors were present, but the pulse-rate was steady, varying from 84 to 107.

She had been under treatment in the medical ward for some weeks, and large doses of bromides had been given which accounted for her somewhat apathetic condition.

Ether was administered by the Resident Accoucheur so as to produce unconsciousness that day, and the procedure was repeated the following day by the same Resident; the idea was to perform the operation at the same time on the third day without arousing

the patient's suspicions at all as to what was going to be done. On the evening of the second day, however, she started labour pains, and I therefore advised the same Resident to start giving her light ether anæsthesia without delay.

The operation was performed about an hour later, by the classical method, and a living male child—five pounds, four ounces—was delivered.

The immediate result of the operation to mother and child was good. The infant, however, was covered from head to foot by a pustular eruption which proved to be a typical bromide rash; it cleared up in the course of a few weeks.

The mother had no breast milk and was unable to nurse her child; after a few days she began to get very excitable and at the end of a week was definitely suffering from delusions. After ten days she was transferred back to the medical ward, where melancholia supervened and she refused to take any nourishment.

When at her lowest ebb, small doses of pituitrin were tried, and she made a slight temporary recovery. At this time she was transferred to the Infirmary, with a hopeless outlook for both mother and child.

Contrary to expectations, however, both survived, and nine months later came up to be seen at hospital. The mother was healthy and well, with a bonny, healthy-looking infant.

Cæsarean Section for Ankylosed Hip.

By Gordon Luker, M.D., B.Ch. (Cantab.), F.R.C.S. (Edin.),

(1) B. C., aged 24, primigravida; was admitted to the London Hospital on April 25th, 1921.

The patient was estimated to be about thirty-six weeks' pregnant. The right hip was completely fixed in a position of adduction and inversion with slight flexion resulting from a double congenital dislocation of hip. There was also some limitation of movement of the left hip; as a result, her thighs could not be flexed or abducted, particularly the right, and thus access to the vulva and perineum was very limited.

The pelvic measurements were: interspinous, eight inches; intercristal, nine inches. The diagonal conjugate was normal.

The patient was examined under an anæsthetic, the fœtal head could be made to engage quite easily and there was no appreciable degree of contraction. The fixity of the hip joints, however, was not diminished under anæsthesia, and it was evident that delivery

could not be effected *per vias naturales*, as it was impossible to separate the thighs and buttocks sufficiently.

The patient came into labour the next day and Cæsarean section was performed by the classical method. A living male child, weighing seven and three-quarter pounds, was delivered, and the patient made an uninterrupted recovery.

(2) C. M., aged 34; was admitted to the London Hospital on December 12th, 1920. Her right hip was fixed, inverted, adducted and slightly flexed, due to a fall on the hip fourteen years previously. Her left thigh could be flexed, but not abducted; the condition of the hip joints allowed only the most limited access to the vulva and perineum. There was also some oblique contraction of her pelvis, with some narrowing of the outlet, but the ordinary measurements were not appreciably diminished.

Cæsarean section was decided upon because it was thought that the head would be unable to pass through the vulval orifice owing to the fixity of the hip joints, for reasons almost identical with those in the case above.

Cæsarean section was performed on December 13th, as a set operation.

The uterus was opened by a vertical incision through the lower uterine segment; a living male child, six and a half pounds, was delivered, and the patient made an uninterrupted recovery.

Cæsarean Hysterectomy for Obstructed Labour on Board a Royal Naval Hospital Ship during the Great War.

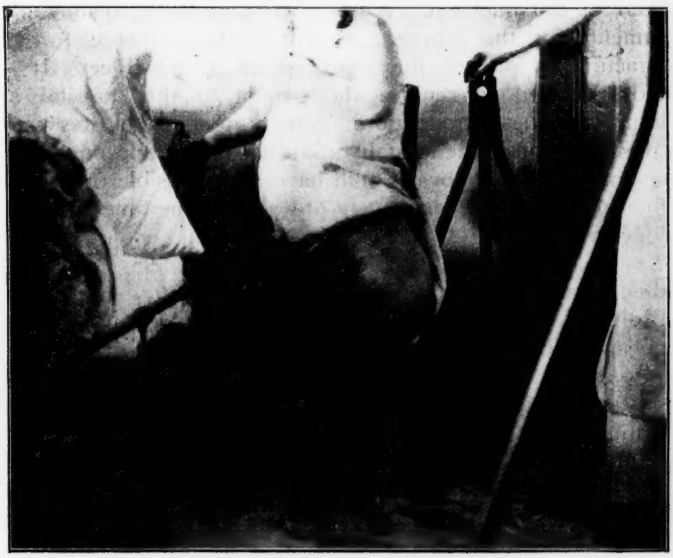
By Donald W. Roy, M.A., M.B., B.C. (Cantab), F.R.C.S. (Eng.),

Assistant Obstetric Physician, St. George's Hospital; Surgeon to Out-Patients, Samaritan Free Hospital for Women; Physician to Out-Patients, General Lying-in Hospital, York Road, Lambeth.

On October 14th, 1915, while serving as Surgeon, R.N.V.R., on board the Royal Naval hospital ship "Plassy" at Scapa Flow, in the Orkneys, I was called in consultation to see a dwarf primigravida, aged 21, who had been forty-eight hours in labour which had become obstructed.

At this time, owing to the death of the local doctor, the medical care of the civil population in some of the islands had been taken over by the Navy, so that the patient was under the care of Fleet-Surgeon Phillips, R.N., and Surgeon Gerrard, R.N.V.R., when I was called in.

The house was about two miles from the ship by water, and fortunately the weather was good, and the gales which, from one quarter or another, blow almost continuously through the winter in these parts had not yet set in. The patient was lying in one of the cupboard beds usual in the islands, which are more adapted to shutting out the searching winds of the island than to obstetrical manipulations.



Achondroplasic dwarf on whom Cæsarean Hysterectomy was performed in Royal Naval Hospital Ship by Dr. D. W. Roy.

On examination, she was found to be a dwarf of very small size. Her condition was fairly satisfactory considering that she had been in labour forty-eight hours. Her temperature was 100.4°F., her pulse 108. She was considerably demoralized, and, in common with the rest of the family, had made up her mind that her only delivery would be by the hand of death. The membranes had been ruptured for some considerable time, and several vaginal examinations had been made. The presentation was breech, pains were occurring every five minutes, and the uterus relaxed somewhat between the pains, but was closing round the child; no Bandl's ring could be felt and no fœtal heart sounds could be heard.

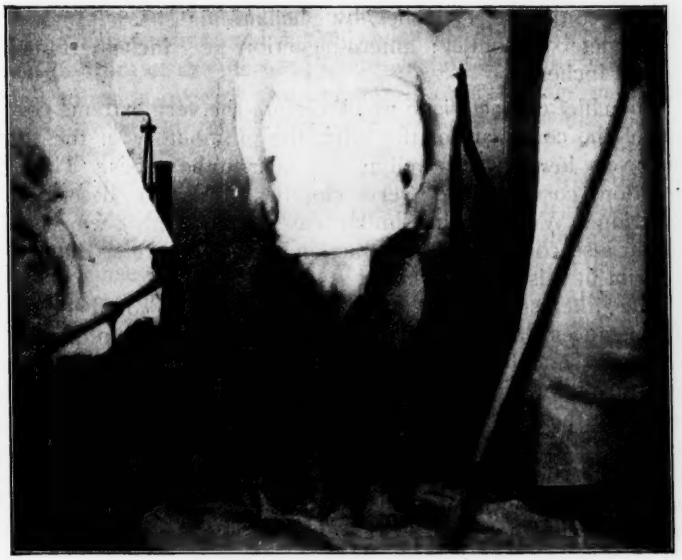
Vaginal examination showed a leg and the cord down in the vagina; the cord was not pulsating, the leg was beginning to desquamate. The child had evidently been dead some time.

It was obviously a very small pelvis, as the promontory of the sacrum was met with almost as soon as the finger entered the vagina, and the single thigh of the child filled up all the available space at the brim and was firmly fixed. The diagonal conjugate was found later to be $2\frac{1}{2}$ inches, the true conjugate was calculated to be $1\frac{3}{4}$ inches, and there was also less well-marked contraction of the transverse diameter at the brim.

It was fairly evident at once that any variety of embryotomy was out of the question, even if there had been available any instruments for the purpose, or if time had allowed for their manufacture in one of the repair ships of the Fleet. It was therefore decided to remove the patient to the hospital ship "Plassy" for Cæsarean section. After a good deal of pressure the relatives abandoned their fatalistic attitude and consented to this being done. This removal would have been possible only during the fine weather which fortunately prevailed at the time. It had to be done in three stages, and of course no lights could be shown. First, the patient had to be carried in the dark along two or three hundred yards of rocky beach to a rough landing-place where a small dinghy could be brought in. She then had to be rowed out to the motor boat and transferred thereto, carried two miles by water to the ship, and hauled on board in the special tray used for this purpose, which is lowered from the ship's winch, and the cot and patient placed on it and slung on board. This is a formidable programme for a woman with obstructed labour in an advanced stage; in bad weather it would have been a nightmare. The naval canvas cot is a very handy contrivance, however, and with ample skilled assistance the patient was safely and quickly got on board the hospital ship, after having had a preliminary hypodermic injection of $\frac{1}{4}$ grain morphia. When she was fit she was prepared for operation. An anæsthetic was given by Temporary-Surgeon Goldie, R.N., and further examination made. Vaginal delivery was obviously impossible, so Cæsarean section was decided upon. There was evidently an added risk of sepsis owing to the length of time the woman had been in labour and the examinations made. Further, the relatives and the patient herself were anxious that she should be sterilized in view of the great risk of another labour should she again become pregnant in that isolated spot, practically cut off for weeks at a time in bad weather from the main island and the town of Kirkwall, the only centre of comparative civilization in the islands, nearly twenty miles away by water. A long septic puerperium could not be risked as the ship might be ordered away at any time in the next fourteen days.

Taking these three considerations into account, I decided if possible to remove the uterus and its contents unopened, leaving

the tubes and ovaries behind. After thoroughly sterilizing the vagina, the prolapsed leg and cord were cut off as high up as possible to minimize the risk of sepsis. With the assistance of Surgeon Heaney, R.N.V.R., the abdomen was then opened and the uterus brought out and packed off with towels. It was found that the presenting part could not be brought up enough to do what was at first intended, so after clamping the ovarian and uterine vessels, the uterus was opened in its lower segment by a transverse incision, the child removed and a sub-total hysterectomy completed by carrying the transverse incision across the rest of the lower uterine segment. The operation was completed in the usual way, leaving both tubes and ovaries and bringing the peritoneum over the completely dilated cervix and lower uterine segment which it was hoped would provide enough drainage to prevent any serious septic infection.



Another view of the same.

The patient made a rapid recovery and sailed away in her father's boat to her home on the fourteenth day, just before the ship left the Flow. During the first twelve days there was a slight rise of temperature between 99° and 100.8°, unaccompanied by other symptoms, which appeared to indicate the probability of more septic trouble if any less radical treatment had been adopted. The patient reported herself quite well at Christmas 1915.

Careful examination and measurements were made before she left the ship and the patient was found to be a well-marked and typical case of achondroplasia, quite intelligent, showing the characteristic facies, the spoke-like fingers with marked capacity for hyperextension, and the absurdly small limbs found in this condition. She showed no evidence of rickets.

Height, 4 feet $2\frac{1}{2}$ inches.

Length of lower limbs from anterior superior spines to heels, 23 inches. Arms $18\frac{1}{2}$ inches.

Length of trunk $20\frac{1}{2}$ inches.

The pelvic measurements were approximately as follows (no callipers were available):—

Inter-cristal, 10 inches, about.

Inter-spinous, $9\frac{1}{2}$ inches, about.

External conjugate, $6\frac{1}{2}$ inches, about.

Diagonal conjugate, $2\frac{1}{2}$ inches, exactly.

True conjugate, $1\frac{3}{4}$ inches, by calculation.

Diameters of outlet: antero-posterior, $3^3/_5$ inches; transverse, 4 inches.

The chief characteristic was therefore the very extreme contraction of the conjugate of the brim, the promontory of the sacrum being very low down as well as very near to the pubes. The pelvic condition corresponded very closely with that described by Whitridge Williams in similar cases, but there seemed to be present also considerable contraction of the transverse diameter of the brim in this case.

The interest of this case is not entirely confined to the circumstances and surroundings, though they are unique in my experience, and it is the only recorded case of Cæsarean section performed in the Navy Medical Service. It caused considerable interest in the Fleet, and gave rise to some ribald jests from senior officers of the combatant branch. It was reported to me that a similar operation, probably Cæsarean section, had been done some years before in an emergency by the surgeon of a French whaler fortunately in the Flow. That patient also survived, but was still more or less of an invalid at the time I was informed of it.

In this country cases of this extreme degree of contracted pelvis are not very often met with, where Cæsarean section is not merely a matter of choice but the only practicable method of delivery, whatever the condition of the child or whatever the risk as regards infection of the patient may be. A well-marked case of achondroplasia, while a not very uncommon condition, belongs to the order of medical curiosities, and such a patient's pelvic measurements are probably worthy of record.

Two Cases of Infection of the Uterine Wall round the Stitches used in Cæsarean Section.

By Donald W. Roy, M.A., M.B., B.C. (Cantab), F.R.C.S. (Eng.).

In August 1919 I had to perform Cæsarean section at the General Lying-In Hospital, York Road, Lambeth, on a multipara, aged 38, with a contracted pelvis. She had had two Cæsarean sections performed on her previously by another obstetrician in 1912 and in 1917. Convalescence from the second operation had been afebrile and uneventful. After the 1912 operation there had been a slight rise of temperature between 99° and 100° for three days which was attributed to an attack of post-operative bronchitis.

When I came to operate on this third occasion labour had started. When I opened the peritoneal cavity very dense omental adhesions were encountered, which had to be divided over a wide area of the front of the uterus. There was an especially noticeable omental adhesion over an area apparently of scar tissue nearly an inch long by half an inch broad rather to the right of the mid-line towards the fundus.

I made the uterine incision to the left of this area through normal uterine wall and removed the child, which was alive and in good condition. When I came to pass the deep uterine stitches for which I use silkworm gut, I was surprised to find pus welling out of the stitch holes in the neighbourhood of the area of scar tissue. The stitches had evidently passed through an abscess cavity at the site of one of the previous Cæsarean scars. The pus was fluid, and there was nothing in its appearance to suggest that it was not infective. I did not therefore feel justified in leaving a probable focus of infection of this kind in the neighbourhood of the uterine cavity, so performed a sub-total hysterectomy, leaving behind the tubes and ovaries.

The patient did not do well, and had a sharp attack of bronchitis with temperature, as well as slight superficial infection of the abdominal wall. She had got over this, and her temperature was normal and her general condition apparently satisfactory on the twelfth day of the puerperium, when she died suddenly from a pulmonary embolism.

When I examined the uterus afterwards I found an abscess cavity, about one inch long by half an inch broad, in the muscle rather nearer the peritoneum than the mucous membrane; the cavity contained about two drams of pus, its walls were rough, and lying loose in it was a thickish linen or silk stitch about

two inches long. The pus was found to contain staphylococci. The rest of the uterine scar appeared normal, and was not easily distinguished from the rest of the uterus.

I have not seen a similar case reported, but have heard of two others in the practice of colleagues, in one of which the uterus was removed, in the other it was left; in both cases the results were good.

In April 1921 I operated at the Samaritan Hospital on a woman who had had Cæsarean section done at another hospital in September 1920, and who had complained since of pain and almost continuous bleeding. The physical signs showed the uterus adherent to the abdominal scar just below the umbilicus. The patient was ill, and showed well-marked secondary anæmia. I opened the abdomen, and found the uterus extensively adherent to the abdominal wall as well as twisted on itself. But the important point in connection with the case was that nearly all the uterine scar, except a small area in the middle, was composed of granulation tissue which extended from the peritoneum almost if not quite to the uterine cavity. Loosely embedded in this were a large number of fine silk stitches, about one dozen. After separating the adhesions to the abdominal wall, which were mainly in the region of the right cornu, I scraped away the granulation tissue and stitches, excised the rest of the scar down to the uterine cavity, curetted the uterine cavity thoroughly by sight, removing much thick endometrium, and sutured the uterus up with two layers of interrupted catgut stitches. The woman quickly recovered, and when last seen was quite free from symptoms; her uterus was normal in position, and freely moveable.

Cases of the character of those reported here make one reflect that while the use of catgut for suturing the uterus in Cæsarean section carries, as statistics show, a special danger of rupture of the uterus in subsequent pregnancies, silk and linen sutures have not a clean record in this respect either. This may be due in some degree to the tendency of this material to retain and protect in its meshes any micro-organisms with which it comes into relation, either at the time of operation or from the uterine cavity or peritoneal cavity after operation, in this way interfering with the primary union of the incision. Silkworm gut, from the ease with which it can be sterilized, its impermeability, strength and lasting power, seems to be the best material at present available for this purpose.

Cæsarean Section for Labour Obstructed by Adhesions between the Anterior Uterine and Abdominal Walls.

By Daniel Dougal, M.C., M.D., Ch.B. (Victoria),

Gynæcological Surgeon, Manchester Northern Hospital; Hon. Assist. Surgeon, St. Mary's Hospital, Manchester; Assistant Lecturer in Obstetrics and Gynæcology, University of Manchester.

The patient was a primigravida, aged 39 years, who had had an abdominal myomectomy performed four years previously. There was no mention of a ventral fixation having been performed.

She was admitted to hospital three days after the commencement of labour and the pains were few and weak.

The breech of the child presented and bulged down the anterior vaginal wall. The cervix was not dilated and could be felt only with difficulty, being high up and posterior.

As natural delivery was not to be hoped for on account of the position of the cervix, Cæsarean section was decided on.

The abdominal incision was made high up and the subjacent area of uterine wall incised. The abdominal wall below the level of the umbilicus was firmly adherent to the uterus. A living male child was delivered and the operation completed in the usual way.

On the sixth day the patient developed symptoms of acute intestinal obstruction and the abdomen was therefore re-opened. The scar in the uterus was now seen to be entirely on the posterior wall and a loop of bowel had become adherent to it. This was separated and the patient made a good recovery.

The unusual site of the uterine incision had undoubtedly favoured the occurrence of intestinal adhesions.

In this case the uterus was adherent to the abdominal wall as high as the fundus and the anterior wall could not therefore grow during pregnancy. To compensate for this, the posterior wall became much stretched, pulling the cervix up with it. Natural delivery was prevented by the cervix being displaced above and behind the presenting part.

Cæsarean Section for Labour Obstructed by Non-Gravid Horn of a Double Uterus.

By Daniel Dougal, M.C., M.D., Ch.B. (Victoria).

This patient, a primigravida, aged 33 years, was seen two days after the commencement of labour. The general condition was good, but the pains very weak and infrequent. She stated that she had passed two pieces of " flesh " by the vagina.

The child presented by the breech but the lie was rather oblique and a soft mass could be felt lying at the brim of the pelvis on the left side and displacing the presenting part.

On vaginal examination, the cervix admitted three fingers, the membranes were ruptured and a foot presented.

I thought that labour was being delayed by a fibroid at the pelvic brim, so had the patient admitted to hospital for further examination.

As no progress was made during the following 24 hours, I decided to deliver by Cæsarean section. This was done and a living female child extracted.

The pregnancy had occurred in the right horn of a uterus bicornis unicollis and the left horn, enlarged to the size of a three months' pregnancy, lay at the level of the pelvic brim and hindered the proper engagement of the presenting part exactly in the same way as a tumour in that situation would have done. Mother and child made good recoveries.

One of the pieces of "flesh" was examined microscopically, and found to be a portion of decidua, presumably from the non-gravid horn.

Cæsarean Section for Uræmia not due to Pregnancy Toxæmia.

By A. Leyland Robinson, M.D. (Lond.), F.R.C.S. (Eng.),
Honorary Assistant Surgeon, Hospital for Women, Liverpool.

Mrs. B., aged 33, ii-para; younger child $3\frac{1}{2}$ years. No miscarriages. Nothing pertinent in family or personal history.

In July 1920, when two months' pregnant the patient complained of difficulty in vision (objects appeared "crooked," no true diplopia) and intense generalized headache.

A large quantity of albumen was found in her urine by the patient's doctor, but under treatment there was considerable improvement in this respect.

Four months later on November 9th convulsive movements of the right side of face, arm and leg suddenly supervened, and the patient became unconscious and remained so (with a few lucid intervals) for ten days.

A physician who was called in diagnosed the condition as uræmic and not due to a pregnancy toxæmia.

On November 19th I found the patient unconscious, delirious and difficult to control. There was right-sided hemiparesis and hemianæsthesia—her speech was incoherent and aphasic—photophobia was marked, and an examination of the fundi disclosed that

albuminuric retinitis was present. The urine was diminished in quantity, contained a large amount of albumen and all varieties of casts, but no diacetic acid. There was slight œdema of the face and ankles.

The uterus corresponded to the size of a 6½ months' pregnancy, the fœtal heart sounds were active. Labour had not commenced. As the patient was getting steadily worse I decided to empty the uterus as quickly as possible, and chose Cæsarean section as the quickest method.

The operation was performed at 7 p.m. the same night, and in spite of an initial pulse-rate of 140 the patient stood the operation well. A living female child was delivered weighing 2 lbs. 13 oz., and measuring 15½ ins. in length—obviously premature but otherwise healthy.

For ten days the mother remained extremely ill, her pulse-rate varying from 150 to 130, and her breathing being frequently cerebral in type. Her mental condition was occasionally quiet but usually delirious, and she was often violent. Her urine continued to be loaded with albumen but increased in amount, and fortunately a fair quantity was maintained. The patient was treated with bromides, aperients, salines, hot packs and diluents.

On the tenth day there was a decided improvement, afterwards the progress was rapid, and the patient left the home on November 17th with her mind clear.

There remained some motor and sensory aphasia with right hemiparesis and hemiparæsthesia, and her vision was slightly impaired. The amount of albumen had diminished, and MacLean's urea index was 1.8.

To my surprise the child thrived and on discharge from the Home weighed 3 lbs. 8 oz.

Apart from a trace of albumen and a raised blood pressure (190 mm. of Hg) there are now (Sept. 1921) no signs of renal disease, and certainly no renal insufficiency.

The paresis has disappeared: there is a little sensory disturbance described as a "burning feeling" in the right side, but the "glove sensation" has gone and the patient, who is an accomplished pianiste, informs me her technique is practically as good as ever. Her memory is good, and there is no trace of aphasia, motor or sensory. The baby weighs 16½ lbs., has two teeth and appears quite healthy.

This case illustrates:—

(1) The effect of pregnancy in developing latent renal disease.

(2) The advantage of Cæsarean section as a means of rapid delivery—free from the shock and delay associated with other methods.

(3) The survival of an infant weighing less than 3 lbs. in spite of an unhealthy pre-natal environment.
(4) The improbability that the child would have survived any other method of delivery.

Cæsarean Section for Osteoma of the Broad Ligament.

By Clifford White, M.D., B.S. (Lond.), F.R.C.S. (Eng.).

Surgeon, Samaritan Hospital for Women; Gynæcologist, Metropolitan Hospital; Obstetric Surgeon, Queen Charlotte's Hospital.

Examination under anæsthesia at the 32nd week in consultation with Dr. Arthur Stabb showed available pelvic space too small to permit of induction of labour. At the operation the ureter was found to run over the most prominent part of the bony tumour which was growing between the layers of the left broad ligament and separating the iliac vessels.

The mother and child made an uninterrupted recovery. Twelve months later the osteoma was about the same size.

Cæsarean Section for Double Lobar Pneumonia.

By Clifford White, M.D., B.S. (Lond.), F.R.C.S. (Eng.).

The patient was a primigravida. During the influenza epidemic of November 1918, and when the patient was at term, she was seized with double lobar pneumonia. Labour having started next day Cæsarean section under spinal anæsthesia was deemed to be the safest treatment for mother and child, and was therefore carried out. The mother recovered and the child lived.

Cæsarean Section for Severe Pain.

By Clifford White, M.D., B.S. (Lond.), F.R.C.S. (Eng.).

In this case, which was a twin pregnancy, the mother complained of the most intense pain over the region of the right kidney. The head of one child was situated immediately over the painful area. All the principal sedatives were administered without in anyway relieving the pain which at last became so intolerable that the pregnancy had to be terminated. Cæsarean section was the method chosen, and an immediate relief of the pain followed. The twins weighed 7 and 6 lbs. respectively, did well, and the mother recovered

Two Cases of Cæsarean Section for Contraction Ring in the presence of Probable Infection.

By Aleck W. Bourne, M.B., B.Ch. (Cantab.), F.R.C.S. (Eng.).

Obstetric Surgeon to Queen Charlotte's Hospital, and to Out-Patients, St. Mary's Hospital.

Case I.—*Cæsarean Hysterectomy.*

Mrs. M., primigravida, was first seen by me in December 1910, at 20.00 hours, after having been in labour for four days. The membranes had ruptured at the beginning of labour and a breech presentation with extended legs was diagnosed, the os being half dilated.

The os was readily dilated by hand, and, on attempting to bring down a leg, a contraction ring was discovered tightly gripping the child round the abdomen. Extraordinary difficulty was experienced in bringing down the legs, and this operation required nearly an hour. The necessary manipulations had rendered the uterus still more irritable in spite of deep anæsthesia, with the result that the ring became even more unyielding, and it was impossible to pull the shoulders through it. A weight, in the shape of a flat-iron, was then tied to the foot of the child and allowed to exert traction for two hours, but as there was no progress at all during this time, and as the patient's general condition was deteriorating owing to blood-loss and shock, she was removed to St. Mary's Hospital.

On arrival, a final attempt was made to bring the arms through the ring, but a serious hæmorrhage accompanied this manipulation. The patient's condition was now so alarming that it was decided to deliver by the abdomen by excising the unopened uterus. This course was chosen, partly to avoid further bleeding, and partly because it was almost certain that the uterus was badly infected, which, in her shocked condition, would probably set up a fatal septicæmia.

It was noted that relaxation of the ring did not occur even after the uterus had been removed from the body, though the upper and lower segments were flaccid.

All the usual restorative measures were applied, but a few hours after the operation the condition of the patient was desperate, and she was therefore transfused with a pint of her husband's blood. Her improvement was rapid and complete.

The convalescence was disturbed by a pelvic cellulitis resulting from severe laceration of the cervix produced during the attempt to bring down the extended legs. Eventually the patient was discharged quite well.

On incising the uterus after its removal it was found that the head and arms were extended in the upper compartment of the fundus.

CASE 2.

Mrs. D., 28, primigravida, came into labour on February 14th, 1921, at 17.00 hours. The pelvic measurements were normal, and the presentation was an occipito-posterior, but was not recognized as such until after labour had lasted six hours in the second stage. The membranes ruptured with nearly full dilatation on February 15th at 12.00 hours, and as there was no descent by 16.00 hours the patient was examined with a view to applying forceps. The head was found to be firmly wedged in the brim of the pelvis, and attempts to rotate the occiput forward were fruitless. Forceps traction failed to move the head. I saw the patient at 18.00 hours, and as the child was alive made further attempts to rotate the head and deliver with forceps, but was unsuccessful after a prolonged trial.

During the course of my attempts to rotate I found that there was a localized annular spasm of the uterus very tightly gripping the child's neck, and it was not possible to pass a finger up between the ring and the child's neck. In view of the exceptional tightness of the ring, the irreducible posterior position of the occiput, and the child being alive, it was decided to transfer the patient to St. Mary's Hospital, and deliver by Cæsarean section.

On admission the patient's general condition was good, and her pulse-rate was 110.

When under the anæsthetic the characteristic hour-glass shape of the uterus could be seen through the abdominal wall.

A large incision was made in the abdominal wall, the uterus eventrated before opening it, and the abdominal cavity thoroughly packed off with towels.

An incision was first made into the fundus above the ring, but delivery was not possible until the ring had been divided. The child was dead.

The uterus was packed with gauze soaked in eusol and then sutured with one row of interrupted silk-worm gut and a row of interrupted Lembert fine thread sutures for the peritoneum.

The gauze pack was removed the next day. The convalescence was uneventful, the temperature never rising above 99.2° F.

Comment. The noteworthy feature about Case II was the entirely afebrile convalescence after the operation had been performed following prolonged efforts to rotate and deliver by three different people in a dirty tenement dwelling.

I think that the packing of the presumably infected uterus by gauze and a chlorine antiseptic may have contributed to this. Milton's fluid would probably have acted more efficiently than eusol, but was not available.

In Case I the uterus was removed chiefly on account of the fear that further bleeding would have been fatal. If the general condition had been good I should have packed with gauze and an antiseptic as in Case II.

Two Cases of Cæsarean Section for Pregnancy in a Uterus Bicornis Unicollis.

By Leonard Phillips, B.Sc., M.S., M.B. (Lond.), F.R.C.S. (Eng.),
Obstetric Surgeon to Out-patients, Queen Charlotte's Hospital; Gynæcological Surgeon to Out-patients the Hospital for Women, Soho Square; Obstetric Tutor, St. Mary's Hospital, Paddington.

The writer is indebted to Mr. T. G. Stevens, under whose care they were, for permission to publish these two cases.

Case I., Jan. 6, 1914. E. A., aged 20, second pregnancy, having had one normal labour in 1910, was sent to Queen Charlotte's by her doctor, who diagnosed "tumour, obstructing labour."

Condition on admission. The fœtal head was movable above the pelvic brim, and the fœtal heart sounds were normal. The back was on the left side and limbs on right. The os was three-quarters dilated. The membranes were ruptured and the cervix was œdematous, especially posteriorly. The occiput was anterior and to the left.

A soft tumour, the size of a closed fist, could be felt in Douglas's pouch lying below and in front of the head and effectually prevented its descent.

Operation by Mr. Stevens, 6/1/14, Cæsarean section. The placenta was anterior. A living child was extracted, and the uterine wound closed with interrupted silk sutures. The tumour was brought up from the pouch of Douglas and found to be the empty horn of a bicornute uterus, the tissue at the junction of the two horns being very œdematous from pressure.

The cause of the obstruction was not interfered with.

Three days after the operation a complete decidual cast, measuring $3\frac{1}{2}$ in. by $2\frac{1}{2}$ in., was passed from the non-parturient horn.

For two days after operation the urine contained albumen, .2 per cent. Four days later the urine was normal, but off and on showed

presence of albumen from this date till the day the patient left the hospital. The puerperium was afebrile.

Subsequent history. Four years later the same patient was admitted to Queen Charlotte's Hospital for albuminuria complicating pregnancy.

On bi-manual examination a bicornute uterus could be made out—the right half containing a four months' pregnancy. The left cervix looked downwards and forwards as though the uterus were retroverted. There was no swelling in the pouch of Douglas. This patient was treated in the Ante Natal Department and finally delivered on June 17th, 1918, of a full-time child. The labour was normal. The puerperium was afebrile. The œdema of the legs and the abdomen disappeared after labour, and there was only a trace of albumen in the urine when the patient was discharged from hospital.

Case 2. A. M., 32 years of age, primigravida; admitted to St. Mary's Hospital 21st Feb., 1920, for obstructed labour.

Her pregnancy had been complicated by constant pain in the left horn and bearing down pelvic pain of a chronic character. Her doctor, feeling a soft swelling in the pelvis, had sent her to hospital as a case of ovarian cyst complicating labour.

Condition on admission. Frequent and feeble uterine contractions were present. The fœtal head was in the fundus of the uterus—the breech floating in the right iliac fossa. A fluctuating mass occupied the hypogastrium. The fœtal heart rate was 142. Vaginally a soft and tender swelling, the size of an orange, could be felt in front of the vagina. No cervix could be felt.

Operation, 21/2/20, by Mr. Stevens; Cæsarean section. The uterine wall very thin. A living child was extracted. The uterus contracted down quickly and very firmly, but could not be lifted out of the abdomen owing to a tough adhesion passing from the fundus to the sacrum. After separating the adhesions, the uterus was found to be bicornute—the left half having been pregnant and stretched to a maximum whereas the right half was fixed in the pelvis. The uterine wound was closed with deep interrupted silkworm gut sutures and a superficial thread Lembert continuous suture.

Seventeen days after the operation the patient was discharged. The puerperium was normal and afebrile. On the day of her discharge no trace of the bicornute nature of the uterus could be detected on bi-manual examination.

Both cases are interesting and alike in that the non-pregnant horn definitely obstructed labour, and gave the physical signs of a soft pelvic tumour.

Cæsarean Section for Sacculation of the Uterus.

By Beckwith Whitehouse, M.S., M.B. (Lond.), F.R.C.S. (Eng.).

Honorary Obstetric Surgeon, General Hospital, Birmingham.

Mrs. R., a multipara, was admitted to the General Hospital, Birmingham, on account of severe cystitis and intense abdominal pain. She was seven months pregnant in her third pregnancy, and the symptoms had progressively increased in severity from the third month. On admission the patient appeared to be in great pain, and the pregnant uterus presented the appearance shown in the accompanying plate.

Sacculation of the Uterus.

On abdominal examination a median bilobed tumour was palpable extending to the level of the umbilicus. The lower portion consisted of the distended bladder with much thickened walls. The upper portion was formed by the upper pole of the pregnant uterus.

Vaginal examination was almost impossible owing to the much distended sacculus of the uterus in the pouch of Douglas, extending almost to the perineum. The urine contained much pus and blood.

Owing to the impossibility of replacement and the extremely septic condition of the urine it was decided to adopt the abdominal route. The sacculation of the uterus could not be relieved and Cæsarean section was performed through a fundal incision. A dead seven months' fœtus was delivered. In spite of considerable thinning of the posterior wall of the uterus involution proceeded normally and the patient made a good recovery. The cystitis rapidly subsided after operation.

Post Mortem Cæsarean Section.

By Carlton Oldfield, M.D., B.S. (Lond.),
F.R.C.S. (Eng.),
Hon. Obstet. Surgeon, General Infirmary, Leeds.

The patient, a multipara, aged 40, was admitted to the Women and Children's Hospital, Leeds, in the last month of her pregnancy, on account of valvular disease of the heart with failure of compensation. One morning I was going round the ward when a nurse came up hurriedly to report that the patient had suddenly died in bed. It was clear, when I arrived at the patient's bed-side, that she was dead. An incision was made with a scalpel at once through the abdominal wall, which did not bleed, and then through the uterine wall, which oozed slightly. A living child was extracted: it cried at once, but only faintly. The body of the mother was removed to the mortuary. A post-mortem examination was not allowed. The child only lived three days. It was never vigorous and did not take its food satisfactorily. The cause of its death was not diagnosed, but it was probably due to deficient vitality.

ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION AT NEWCASTLE-ON-TYNE, 1921.

President, R. P. Ranken Lyle, M.D.

THE INDICATIONS FOR CÆSAREAN SECTION.

The opening papers by Professor Munro Kerr and Mr. Eardley Holland will be found on pages 338 and 349.

DISCUSSION.

Dr. W. Robinson (Sunderland) was glad that the operation had not been recommended for nearly every variety of difficult labour, as the tendency now was because it was so easy of performance and so dramatic in character. It was easy for the woman as well as the surgeon. One patient had said to him some days after an operation, "They all ought to come that way, doctor." He thought, too, that all first labours at least, and all in which complications were expected, should take place in homes or hospitals, so that the woman and child might have the benefit of asepsis and of surgery if required. For placenta prævia (central and marginal) the operation should be done in preference to turning—so fatal to many children. His experience made him opposed to the operation for eclampsia, or at least doubtful of its utility. The collection of the statistics up to date was a most valuable piece of work. That the operative mortality, in clean cases, by various surgeons should be as low as 1.6 per cent. was another triumph of modern aseptic surgery, but it must be taught emphatically that the safety of the procedure for patients actually in labour lay in operation before the membranes had ruptured, as certainly as did operation for acute appendicitis immediately after its onset. Delay spelt danger. He hoped that the low transverse extra-peritoneal incision recommended to be used in all cases to prevent the occurrence of a subsequent weak scar, and the possibility of rupture in a future pregnancy, might occasionally prevent the fatal peritonitis which took place in some of those operated upon after the membranes had ruptured and frequent examinations or attempts at delivery had been made.

Lady Barrett (London): What Professor Munro Kerr and Mr. Eardley Holland, in their extremely useful papers, had been

able to give in the short time at their disposal only hinted at the vast amount of work they had done in preparing the statistics of all cases of Cæsarean section since 1910. On the usefulness and safety of Cæsarean section for cases of contracted pelvis all were agreed, and she would refer briefly to one or two of the other indications that had been discussed. Cæsarean section in cases complicated by fibroids showed a surprisingly high mortality. She suggested that in cases complicated by fibroids, in which quite clearly the fibroid would cause obstruction to labour, the safer treatment would have been to remove the fibroid by myomectomy during the pregnancy, thus allowing a natural labour to take place at term. In Cæsarean section for eclampsia, in which the results also showed a very high mortality, it was not so easy, as was sometimes suggested, to distinguish the cases which were especially dangerous. Some cases in which Cæsarean section was performed very shortly after the advent of albuminuria, and possibly with no other symptoms, might develop postpartum eclampsia and die, while advanced cases with almost total suppression of urine might have uneventful recoveries. She believed the mortality of Cæsarean section for placenta prævia in primigravidæ would be very much lowered by a united opinion that it was the right treatment; the mortality, she thought, was high just because doubt existed and so many of the cases were subjected to other attempts at delivery or to frequent examinations before the operation was performed. She heartily agreed with Professor Munro Kerr that accidental hæmorrhage occupied a different position. If the abdomen was opened in accidental hæmorrhage it was to perform hysterectomy instead of or after Cæsarean section. The mortality of the latter was so high that she thought it should be rejected and that hysterectomy should only be undertaken in extreme cases, because not only did the mother lose the present child but was deprived of the possibility of having others. Lastly, she would like to emphasize the usefulness of Cæsarean section in cases of extreme heart failure, because delivery by that method subjected the patient to less effort and less shock than any other. She believed that a general anæsthetic for this purpose, such as open ether with oxygen, was more desirable than spinal anæsthesia. With regard to method, she confessed to having used the classical operation only, probably because she saw such bad results following the low incision in Vienna. Certainly morbidity had been high there in association with all methods, but it seemed to her particularly high in cases of the low incision. She rather doubted whether the drag on the wound in the more muscular part of the uterus was as great as Mr. Eardley Holland had suggested; if it were, it was difficult to imagine how, in the days preceding suture, any cases at all healed.

Professor WALTER SWAYNE (Bristol) drew attention to the fact that the class of cases with the highest mortality-rate consisted of those in which attempts had been made to deliver in spite of an unrecognized obstruction. A large number of such cases could be avoided by more careful supervision and examination during pregnancy; although this would not prevent some cases coming into the category, there was no doubt that the number could be and ought to be diminished. He thought that for complications other than disproportion there was a tendency to make use of Cæsarean section as a means of treatment without a clear idea as to the objects to be attained. Its indiscriminate application in such cases was to be deprecated and definite limitations should be laid down. He suggested that such an investigation as that carried out by Professor Munro Kerr and Mr. Eardley Holland should be carried out at much more frequent intervals, say every two years, in order that all the workers in this field might have an opportunity of comparing their work and revising their methods. One great advantage of such an investigation as the present lay in the comparison of the conditions obtaining in different localities for which it gave opportunity. In the West of England, for example, contracted pelvis was relatively uncommon, while the other complications of labour were, in some instances, above the average. These local differences were important, since they had a direct bearing on the relation between the number of emergency and elective operations and produced differences in immediate indications and technique.

Mr. R. J. JOHNSTONE (Belfast) joined in the hope that the collection of statistics would be continued, say, for the next five years. He was himself a convinced supporter of the operation, and thought that the indications for it might be reasonably extended to many cases in which the life of the child was exposed to more than ordinary risk by the ordinary methods of delivery, as, for instance, in prolonged gestation, or in breech presentation in a primigravida with an abnormally large child. Such an attitude would be, of course, indefensible were it not clearly shown, as it had been, that in uninfected cases the risk to the mother was very small. He differed from Mr. Holland's view of the physiological activity of the uterus after parturition, and regarded it as being in a condition of mild tonus, rather than in active contraction. He thought the fears expressed as to the probability of obtaining a sound scar in the upper part of the uterus were exaggerated. He always used catgut for the suture, and put in three tiers of continuous suture. In over eighty operations he had had one case of rupture of the uterus.

Mr. GORDON LEY (London) was glad that Professor Munro Kerr had emphasized the possibility of extending Cæsarean section to

those cases of prolonged labour with early rupture of membranes, one of the most troublesome complications in midwifery, particularly met with in elderly primigravidæ. With regard to the action of the uterine muscle in inhibiting healing of the uterine incision, he could not agree with Mr. Johnstone. Surely, he said, the uterine contractions during the puerperium were similar in nature to those during labour—that is, they tended to make the site of union gape, as was seen at operation, and thus to inhibit healing. In two cases of laparotomy for spontaneous rupture of the uterus he had found the uterus partially inverted through the tear in the anterior wall. This emphasized the drawing apart action which was noted at operation.

Mr. Beckwith Whitehouse (Birmingham) said that the change of opinion during the past ten years with regard to resort to Cæsarean section in the treatment of placenta prævia was extremely interesting. About ten years ago, at a discussion at the Royal Society of Medicine upon this subject, Jellett had, he believed, made the statement that, "although he did not think the Cæsarean operation wrong for placenta prævia, he could not see the necessity for it." This was the view expressed by the majority of speakers at that discussion. To-day the position was reversed, and Cæsarean section was being advocated as the ideal treatment for central and lateral cases. Personally, he was in complete agreement with this view. The tendency had been, and by many practitioners still was, to regard placenta prævia as an obstetric complication which could be dealt with quite satifactorily by version. If the mother was saved all was well, and the loss of the child was not considered. As a matter of fact, version in placenta prævia was not an operation free from danger to the mother, quite apart from the terrible fœtal mortality. In statistics covering ten years at the Maternity Hospital, Birmingham, the maternal mortality in cases of version for placenta prævia amounted to over 4 per cent., whilst the fœtal mortality reached the appalling figure of over 70 per cent. Institutional figures, in estimating the value of any method of treatment, were always the most reliable, since the personal factor was eliminated. There was little doubt that in placenta prævia a real difficulty was to define when Cæsarean section should be done and when it should not be done. Were all cases to be treated by operation, and, if not, what was to be the guiding line? Mr. Whitehouse's own practice in all cases of central and lateral placenta prævia at or after the eighth month of pregnancy was to perform Cæsarean section. The initial hæmorrhage was the important symptom which should lead to examination and diagnosis and to immediate treatment. Personally, he would like it to go forth from the Section that placenta prævia was an obstetric

complication which could be dealt with satisfactorily only in a hospital or nursing home, and one in which Cæsarean section was very likely to be required. Version was not to be regarded as being an operation free from risk to the mother, and statistics did not place it on as favourable a basis as modern Cæsarean section. He had performed the lower segment operation upon two occasions, according to the method advocated by Professor Munro Kerr in 1920 at the Royal Society of Medicine. Each time, however, he had experienced some difficulty. At the first operation there was much troublesome venous hæmorrhage from vessels in the lower uterine segment. On the second occasion considerable difficulty occurred in extracting the child. Apart from this criticism, the operation appeared to be based upon sound principles, and possibly these initial difficulties would disappear with further experience of the method.

M. J. Webster Bride (Manchester). The remarks made by Mr. Bride are embodied in his paper on page 463.

The President, Dr. Ranken Lyle, said: I desire on behalf of the Section to offer to Professor Munro Kerr and Mr. Eardley Holland a most cordial vote of thanks for their extremely interesting and very learned papers. The writing and compilation of these papers must have entailed much hard work and thought, and we all most cordially congratulate both writers. When the committee selected this subject for discussion it had in mind two most important considerations: First, that there were no definite rules or indications laid down for the performance of Cæsarean section, and consequently in many cases it was not performed when it might have been of great advantage, and in some cases it was performed when the indication for it was not very definite; and, secondly, that owing to the rapidly improving results obtained, the operation was justifying its extension to many cases in which hitherto the indications for it were not considered sufficient. The committee thought that by choosing this subject for discussion the Section would be able to lay down more or less definite indications which would act as an authoritative guide to all operators in the selection of cases for operation.

Professor Munro Kerr, in his most able paper, has, I think, completely fulfilled the wishes of your committee. He has given a large number of indications, and has indicated in what cases he considers the operation is of doubtful propriety. I entirely agree with him in everything he has laid down, with one exception, and that is in cases of contracted pelvis. I consider that a true conjugate of $3\frac{1}{2}$ in. should be a definite indication for Cæsarean section at term rather than $3\frac{1}{4}$ in. He has shown that Cæsarean section in eclampsia, although frequently performed, is not desirable on

account of the very heavy mortality, and has also stated that more attention should be given to prophylaxis and medical treatment. With this I most cordially agree. There is only one other point I should like to criticize in his paper. He says that in those cases in which one might anticipate a rupture of the uterus on a subsequent occasion the patient should be sterilized. I am not of this opinion. I am a strong supporter of conservative Cæsarean section, and I do not think that any form of prospective trouble should be be an indication for sterilization. In 1910 very few teachers in this country believed in aboslute conservative Cæsarean section. At the present time I think that nearly half the teachers in this country advocate it, and I believe that before many years it will be the unanimous opinion of the profession that conservative Cæsarean section should be adopted in all cases.

Mr. Eardley Holland has taken an infinity of trouble in collecting and tabulating nearly 4,000 cases of Cæsarean section performed in this country during the last ten years. The results which he has shown in definite percentages are a most valuable guide to everyone as to the nature of the cases in which the operation is highly desirable, and of those in which the operation is of doubtful propriety.

The high mortality in the third and fourth classes—namely, patients very long in labour, patients after forceps, etc.—is, I have no doubt, going to be reduced very considerably in two ways: First, by the ever-increasing number of patients who are seeking institutional treatment, when the necessity for the operation will be either anticipated or discovered at a much earlier period; and, secondly, by the extension of pre-maternity work all over the country.

I am deeply impressed by the importance and value not only of these papers but of the subsequent discussion thereon, and have no hesitation in stating that they mark a great advance in our knowledge of the indications for the performance of this operation.

BOOK REVIEWS.

"A Nurse's Handbook of Obstetrics." By J. B. Cooke, M.D. (Lippincott's.) pp. 468, illustrations 188, coloured plates 4. Price, 12/6 net.

It is obvious from a consideration of the general plan of this book that it is intended for the obstetric nurse rather than for the practising midwife. As such it admirably fulfils its purpose, and the fact that it has reached a ninth edition since the date of its first publication in 1903 testifies to its popularity. A fairly comprehensive survey is given of the obstetric art, stress being laid on the points which lie more particularly within the scope of the nurse's duties, while sufficient information is given on other matters to enable the nurse to understand what the physician is about, and consequently to co-operate with him intelligently. For instance, the preparation of the patient for normal labour or for a forceps operation is very clear and concise. About a quarter of the book is devoted to a description of the management of the infant, and the section on artificial feeding is well done. There is a good index and a glossary explaining shortly the medical phraseology used in the book. It would, of course, be easy to pick out minor points and inaccuracies for criticism. It must be confusing for the nurse to read that it is the function of the amniotic sac to provide the fœtus with nourishment and oxygen. It is stated that in a face presentation the child cannot be born without operative interference, and no mention is made of the show in the description of the early stages of labour. A more serious omission, however, even when one fully recognizes that the book is apparently meant for the nurse rather than for the midwife, is the fact that in the section on postpartum hæmorrhage the simple and effective manœuvre of bimanual compression is not mentioned; the nurse is instructed to pack the uterus with gauze, if more ordinary measures fail. Again, in cases of severe antepartum hæmorrhage the nurse is instructed to put the patient to bed and give a hypodermic injection of morphia if she cannot secure the immediate attendance of a physician. The method of plugging the vagina is not mentioned.

The illustrations, as in most American text-books, are good, though many of them are borrowed from well-known European books. There are some photographs, however, showing Sylvester's method of artificial respiration for the asphyxiated infant in which, contrary to our practice, the feet are not being held by an assistant.

C. Nepean-Longridge.

"Simplified Infant Feeding." By Roger H. Dennett, B.S., M.D., Associate Professor of Diseases of Children, New York Post-Graduate Medical School, etc., etc. Fourteen illustrations. 2nd edition, revised and enlarged. J. B. Lippincott Company, Philadelphia and London. Price, 21/- net.

This is a title to raise one's hopes. An uneasy conviction grows, however, as one reads the book that much of what the author means by simplicity is really the result of a somewhat narrow view of his subject. He writes from the angle of one who sees the infant as a thing to be *fed*, very much as certain people saw the war in

terms of *shells*, and who subordinated every other to this one consideration. It is true that at the outset, and at intervals through the text, he warns the reader that this is not an entirely profitable method. Yet it remains the essence of his teaching. And it is teaching from which the whole infant welfare movement has been steadily breaking away in this country for the past ten years. One reads this book therefore with an interest akin to watching a golfer who has contracted what one holds to be a radically bad style, stimulated by a curiosity to see what sort of a card he will return. If the metaphor be allowed, one must confess that Dr. Dennett plays certain holes and many shots extremely well. But on a number of occasions he has simply no other course than to pick up his ball.

The chapters on caloric feeding are simple and helpful as far as they go; they will serve excellently to train the practitioner in the elements of this method of calculating an infant's simplest food requirements. So, too, we believe the teaching that the majority of artificially fed infants will thrive on boiled cow's milk and water feeds with sugar added, is good teaching. But it is a naïve form of simplicity to leave it quite so confidently at that point, as does the author. His recommendations as to the use of dried milk, and the advantages of its greater digestibility, are nothing short of astonishing, and he states a clinical experience of this method which is in flat contradiction to that of most English physicians. Indeed his words leave one with a conviction that American babies possess a digestion radically different to anything to which their English cousins can lay claim. "For example, a seven-pound infant needs in twenty-four hours twenty-one tablespoonsful. If the infant is given seven feedings a day (three-hour intervals) each feeding would therefore contain three tablespoonsful of dried milk." One has yet to meet the English baby who could stand this. The instructions for feeding after weaning and through the second year favour cow's milk and cereals more than is customary here. But there are interesting differences in custom. A feature of the book which strikes one as a cardinal fault is the order in which the chosen aspects of feeding are presented. There is something fundamentally wrong with a doctrine of "simplified" feeding which postpones the consideration of breast nursing until the 17th of 30 chapters, and which at that point only devotes to it 34 out of nearly 400 pages. There are still too many gaps in our knowledge of this supremely important function for any treatise on infant culture to be truly simple. Still the fact remains that breast feeding is the only type of feeding that can ever hope to deserve the title of simple; and the author of this book never convinces us that he is aware of the possibilities which are offered by a fuller investigation of this method. He endorses its advantages, it is true; but he submits far too passively to its failures. There is no mention, for example, of test weighing as a valuable means of ascertaining how much an infant takes from the breast in a case presenting nutritional problems. Case lxi is described as an instance of severe vomiting in an infant "caused by breast milk." The presumption is that the milk was in some respect of unsuitable quality. But the argument is not convincing because the amount taken at a feed was never ascertained. One remains suspicious that the child throughout was suffering from over-alimentation with rich breast milk.

Dr. Dennett mentions the spasmophilic type of infant, but he does not refer to the further valuable classification of clinical types such as have been made by Czerny, and more recently by Cameron. One looks in vain for recognition of the influence of catarrhal infections in nutritional disorders described so convincingly in that writer's "Diet and Disease in Infancy." Nevertheless, this book contains a great deal that is valuable and much that is ingenious and practicable. It is, in the main, easily read, though the use of the verbs to feed and nurse are somewhat unfamiliar, as when a baby is said to nurse its mother. The headings of paragraphs are often cumbrous and are phrased in the form of exhausting conundrums, loaded with

capitals. "Does the Change from Unboiled to Boiled Milk Cause Digestive Disturbances when Fed to Infants Who Have no Difficulty in Digesting Unboiled Milk?" is a fearful question. "Mother's Bowels," a sub-title, on another page, startles one, by contrast, with the crude brevity of an Elizabethan oath. The illustrations are good, though their choice is not inspired. The nurse pouring water into a baby's stomach holds the funnel about 18 inches too high.

HAROLD WALLER.

"Gynæcology." Brooke M. Anspach, M.D., Associate in Gynæcology, University of Pennsylvania. Publishers, J. B. Lippincott Co. £2.2.0.

THIS volume is a masterly, up-to-date exposition of the main practical facts of gynæcology compressed into a text-book of moderate size. It is well printed and amply illustrated, the author having drawn freely from many of the best diagrams and photographs in other books.

The first four chapters deal with embryology, developmental anomalies, anatomy and physiology of the reproductive organs, in a concise manner, and in such a way that little difficulty should be experienced by the beginner in understanding and grasping the fundamentals of gynæcological problems.

The succeeding four chapters are devoted to history taking, general physical and other methods of examination of the patient, together with special methods of examination of adjacent organs such as the bladder, kidneys and rectum, these organs being dealt with in a more comprehensive way than is usually found in books confined to gynæcology.

The next 18 chapters deal with the different diseases of the various portions of the genital tract in a systematic manner; they are not overcrowded with detail but contain the necessary facts expounded in a concise manner. In places but little room is given to pathology, which is probably explained by the author's statement that he has purposely omitted such details as are not immediately required for practical purposes. The book is indeed thoroughly practical.

Two very instructive and original chapters are included in the book. One on the hygiene and proper care of adolescence in the female, which illustrates well what is often neglected, the value of prophylaxis in the prevention of many female complaints in after years. The other, a most valuable chapter dealing with the commonest of gynæcological symptoms, namely, "backache in the absence of pelvic disease"; it is one of the best in the book, the author fully explaining the postural or orthopædic origin of this symptom, together with its treatment, which should be understood and capable of correction by an up-to-date gynæcologist.

A useful chapter on the therapeutic value of radium and X-rays is included, full instructions as to the choice of remedy, suitability of cases, dosage, and method of application being given.

The author has drawn fully from the literature and well selected bibliographical references are included at the end of each chapter. We consider he has undoubtedly accomplished what he set out to perform, namely, the compilation of a text-book presenting gynæcology in a systematic form giving all the necessary information, and omitting such details as are not immediately required for practical purposes. We shall expect to see further editions of this book.

ARTHUR GRAY.

Review of Current Literature.

LIST OF ABSTRACTORS.

London.—MALCOLM DONALDSON, F.R.C.S.; A. C. PALMER, F.R.C.S.; L. DOROTHEA TAYLOR, M.D.; FRANK E. TAYLOR, F.R.C.S.

Birmingham.—LEWIS GRAHAM, F.R.C.S.; HILDA N. SHUFFLEBOTHAM, F.R.C.S.

Coventry.—G. G. ALDERSON, F.R.C.S.

Manchester.—F. H. LACEY, M.D.; W. R. ADDIS, M.B

Sheffield.—W. W. KING, F.R.C.S.

American Journal of Obstetrics and Gynæcology.

May, 1921.

ORIGINAL COMMUNICATIONS.

1. *The problem of effecting sterilization in association with various obstetrical procedures. J. WHITRIDGE WILLIAMS.
2. *Submucous adenomyoma. O. H. SCHWARZ.
3. *Practical application of local anæsthesia to surgery of the lower abdomen. R. E. FARR.
4. A statistical study of fœtal deaths occurring in the service of the Women's Hospital of New York. H. C. INGRAHAM.
5. The education of nurses for obstetrical service. S. J. GOODMAN.
6. Maternal welfare in relation to the prevention and early diagnosis of tuberculosis. A. L. MCDONALD.
7. *Ovary containing endometrium. C. C. NORRIS.
8. *Repeated Cæsarean section. P. TITUS.
9. Opportunities for the study of advanced obstetrics. A. M. MENDENHALL.
10. Cholecystogastrostomy and cholecystoduodenostomy. W. W. BABCOCK.
11. *Sigmoido-uterine fistula, with report of a case. W. C. G. KIRCHNER.

CASE REPORTS.

12. Lateral partial hermaphroditism. C. W. MOOTS.
13. A polycystic kidney of an atypical character. LE. R. BROUN.

The problem of effective sterilization in association with various obstetrical procedures. J. Whitridge Williams, in a very long article based upon the study of 15 cases, advocates hysterectomy, rather than resection of the tubes, to effect sterilization. If, however, the patient expresses a wish to continue the menstrual function he will perform the simpler operation.

Submucous adenomyoma. Otto Schwarz reports in detail a tumour of this nature with a full pathological description and photo-micrographs.

The practical application of local anæsthesia to surgery of the lower abdomen. Robert Emmett Farr is an enthusiast for local anæsthesia and describes in

detail his technique, but it appears that only very straightforward operations in selected patients can be undertaken by this method.

Ovary containing endometrium. Charles C. Norris, in the course of a routine pathological examination of an ovary removed on account of periöophoritis, found a small area containing typical endometrium surrounded by non-striped muscle. It is difficult to understand from the description whether the growth was found in the cortex or medulla as the nature of the surrounding tissue is not given, but it is stated to have been " in the middle of the ovary."

Repeated Cæsarean section. Paul Titus reports 16 cases of repeated Cæsarean section. In one case the scar of the first operation ruptured spontaneously at the eighth month of the second pregnancy. There had been clear evidence of infection following the first (classical) section, and in the author's opinion this was the cause of the rupture in the next pregnancy. No mention is made of the material used for suture of the uterine wall.

Sigmoido-uterine fistula, with report of a case. Fistulæ of this type are rare, but they may arise as the result of malignant or tubercular processes, from trauma, or as one of the sequelæ of childbirth. The case here reported belongs to this last category.

The patient had had three difficult labours—the last two being craniotomies. Two days after the third delivery, the patient began to pass fæcal matter from the cervix. At operation a lateral fistula was found between the sigmoid and the utero-cervical junction. This was closed and a drain put through the uterine opening. The patient recovered. The author refers to other reported cases of this condition and suggests that the fistula resulted from the nipping of a mobile loop of the sigmoid between the promontory of the sacrum and the child's head. A bibliography is appended.

W. W. KING.

June, 1921.

1. *Adenomyometritis, not adenomyoma, of the uterus. L. W. STRONG.
2. *Hyperemesis gravidarum. E. SPEIDEL.
3. *Secondary operations : an analysis of one hundred gynæcological cases. E. L. DORSETT.
4. *Chronic endocervicitis. W. T. KENNEDY.
5. *Chorea gravidarum. G. D. ROYSTON.
6. Entwining of umbilical cords in single amnion twin pregnancy. S. F. ABRAMS.
7. *The ovary after hysterectomy for fibroids. E. M. HAWKS.
8. *A study of the hæmoglobin after childbirth with special reference to the resumption of menstruation. M. P. RUCKER.

Adenomyometritis, not adenomyoma, of the uterus. L. W. Strong has attempted to show that adenomyomata are metric hyperplasias rather than neoplasias. The author's difficulties appear to arise from the fact that he only recognizes the possibility of the Müllerian and Wolffian theories of origin, and hence he seeks to explain all adenomyomata upon an inflammatory basis.

Hyperemesis gravidarum. Edward Speidel describes his method of treating this condition, which consists in rectal feeding with an alkaline glucose solution containing peptonoid, and the injection of extract of corpus

luteum. He states that, if these "extreme" measures are unsuccessful, from the experience gained from a number of fatal cases he would unhesitatingly interrupt pregnancy.

Secondary operations: an analysis of one hundred gynæcological operations. Edward Lee Dorsett in this interesting review emphasises the necessity of careful manipulation of the abdominal structures and more especially of the parietal peritoneum, in order to avoid post-operative adhesions. His figures show the large number of cases in which adhesions had formed between the omentum and the peritoneal scar. This he attributes to the use of antiseptics, retractors and forceps to the peritoneal edge, and to the habit of suturing by over-and-over stitches in place of a mattress suture. Omental adhesions may cause traction of the stomach, but as they give less trouble than intestinal adhesions, he advocates covering the intestine with the omentum before closing the abdomen. On the question of removing the uterus in the presence of tubal infection, the age and social status must be considered, but there can be no advantage in leaving even an approximately normal uterus when it is necessary to remove both ovaries and tubes. When possible it is better to leave the uterus and even a small amount of ovarian tissue, and thus ensure at least a more gradual onset of the menopause without serious disturbance. On the whole, conservative measures are rather unsatisfactory when dealing with "cystic ovaries," and, in the case of tubal infections, should be abandoned. Every woman who has her abdomen opened should have her appendix removed at the same time.

Chronic endocervicitis. William T. Kennedy has used ethyl chloride in the treatment of chronic cervical catarrh upon five cases with encouraging results. His method is as follows:—After drying the cervix and applying tincture of iodine to the vaginal portion, the cervix is grasped with a double tenaculum and from one to two cubic centimetres of a 25 per cent. solution of ethyl alcohol in distilled water are injected (with an ordinary hypodermic needle attached by an adapter about 8 cm. long to a Record syringe) into the anterior and posterior lips of the cervix parallel to the canal, care being taken not to penetrate a gland and thus lose the solution in the canal, because it has no value unless it is placed interstitially.

Chorea gravidarum. Grandson Royston, from a review of the literature and the consideration of six cases now reported by him, draws the following conclusions:—

"Pregnancy in a choreic individual is not necessarily serious, though it may assume this character; however, an acute chorea beginning during pregnancy is always a grave affection.

A pulse-rate persistently above 100 and the presence of fever, delirium, and an inability to take sufficient nourishment and rest, comprise a picture of the deepest gravity.

More attention should be given to guarding against predisposing factors. Among the needs in this connection may be mentioned the following:—Proper diet, elimination, exercise without fatigue, adequate rest, and absolute freedom from extraneous worries and cares. During the puerperium, guarding against mental and physical exhaustion, improvement in nutrition and general physical condition, proper elimination, adequate rest, etc., are very important. The interests of the patient are best conserved by early emptying of the uterus as soon as a definite diagnosis of

chorea is made. Pregnancy in the choreic individual should be treated symptomatically and interference with gestation instituted only upon the appearance of symptoms conclusively pointing towards the severe form of chorea. Sterile blood cultures from these cases, two of which were fatal, and the rapid improvement shown after the termination of pregnancy, justify the belief that chorea gravidarum is of toxæmic origin.'

The Ovary after hysterectomy for fibroids. E. M. Hawks. The purpose of this paper is to record some observations upon 84 cases in regard to the ovary left after hysterectomy for fibroids. The author concludes that his observations indicate that it is better to leave healthy ovaries and tubes after hysterectomy for fibroids, when performed at or near the menopause. This opinion is based upon the following points:—

" (1) The onset of the vasomotor disturbance was delayed when one ovary was left and further delayed when both were left. The severity of the symptoms was diminished when one ovary was left and almost eliminated when both were left.

(2) Very little serious harm was caused by a retained ovary. One case in sixty-five was referred for secondary operation on account of a cyst. Twelve cases in sixty-five complained of pain or had a swelling at the site of a retained ovary, but in eleven of the twelve the trouble disappeared after about three months.

(3) There was more trouble when the tube was removed than there was when it was left with the ovary."

A study of the hæmoglobin after childbirth, with special reference to the resumption of menstruation. M. Pierce Rucker has studied the postpartum hæmoglobin contents of the blood in 64 cases, and finds that immediately after labour there is a definite drop in the hæmoglobin from which the patient slowly recovers. The average patient begins menstruating when the hæmoglobin reaches 75 per cent.

July, 1921.

1. *The induction, complicated by hæmorrhage, of labour. E. P. Davis.
2. *Some chemical studies in normal and abnormal pregnancies. J. A. Killian.
3. *The Blood chemistry in normal and abnormal pregnancy. W. E. Caldwell.
4. *A study of the ossification centres of the wrist, knee and ankle at birth with particular reference to the physical development and maturity of the newborn. F. L. Adair and R. E. Scammon.
5. *The administration of pituitrin at the beginning of the third stage of labour. G. H. Ryder.
6. The least common multiple in obstetrics. H. M. Little.
7. *Experimental studies following öophorectomy. H. Bailey.

The induction, complicated by hæmorrhage, of labour. Edward Davis reports four cases of induction of labour. In three patients there was antepartum bleeding. In one it was found to be due to chorionepithelioma, and in two no explanation of the hæmorrhage was discovered. In the fourth case, in which there was *no* hæmorrhage, two of the bougies were found embedded in the placenta after labour.

Some chemical studies in normal and abnormal pregnancies. This study included an analysis of the blood by the Meyer's method for non-protein- and

urea-nitrogen, uric acid, creatinine, sugar, chlorides and the carbon dioxide combining power, and an examination of the urine for protein and casts. The systolic and diastolic blood pressure was recorded.

The authors state that their research demonstrates that toxæmias of pregnancy may be grouped into nephritic and hepatic types.

Readers interested in this line of investigation must read the original article, when they will be able to determine to what extent these conclusions are warranted.

The blood chemistry in normal and abnormal pregnancy. William Caldwell. This paper on the nitrogen content of the blood does not lend itself to abstraction, but the author's final summary and conclusions may be given :

" (1) In normal pregnancy, as compared with the non-pregnant state, we find a low total of non-protein nitrogen, low urea-nitrogen and a very low ratio of urea-nitrogen to the total non-protein nitrogen.

(2) The excretory nitrogenous constituents in the maternal and the fœtal circulations at the end of labour are practically identical.

(3) A definite retention of uric acid in the blood at the end of labour is found only in abnormal cases.

(4) The blood pictures in eclampsia and toxæmia of pregnancy are interpreted most readily in terms of kidney insufficiency.

(5) The significance of a given blood picture can be defined only in the light of the clinical conditions at the exact time when the blood was taken.

(6) Marked kidney insufficiency, indicated by high retention of nitrogenous waste products warrants a very grave prognosis.

(7) High creatinine retention seems to warrant a serious prognosis.

(8) When the nitrogenous constituents do not return to normal early in convalescence, a doubtful prognosis for subsequent pregnancies is justified.

(9) A rapid return of the blood picture to normal justifies a favourable prognosis for subsequent pregnancies.

A study of the ossification centres of the wrist, knee and ankle at birth, with particular reference to the physical development and maturity of the new-born. F. L. Adair and Richard Scammon undertook this study with the object of determining the condition of the ossification centres of the new-born and their relationship to the maturity of the child. The material was obtained from new-born children by radiography.

This important paper must be studied in the original which not only describes the authors' findings in detail but compares them with other published reports. A very full bibliography is given.

The authors' figures demonstrate that the ossification of the inferior femoral epiphysis is " somewhat more precocious " than recent writing would indicate.

It is rarely present at the 28th week, and hence its presence may be taken as a certain indication of viability. This centre is present in half the cases at the 36th week and in 98 per cent. of children born at term.

The superior tibial epiphysis appears distinctly later. It is not found before the 32nd week, and at the 40th week it is present in 75 to 80 per cent. of all cases. This centre is therefore a more useful test of maturity than is the inferior femoral epiphysis. Its presence shows that the child has passed the 36th week, but its absence does not necessarily indicate prematurity.

The ossification of the Os Calcis is uncertain. Its presence indicates that the child has passed the 36th week, but since it is not found in 40 per cent. of full-term children its absence cannot be regarded as significant of prematurity.

The ossification centres in the Os Magnum and Unciform may be present at the ninth lunar month but are uncertain.

The authors' material shows a close correlation between body-weight, body-length and the frequency of ossification with menstrual age in cases ranging from 270 to 300 days gestation. But outside these limits there is but little relation between the various factors.

The administration of pituitrin at the beginning of the third stage of labour. C. Ryder advocates the routine use of one cc. of pituitrin at the beginning of the third stage of labour. He considers it a safe procedure but, as his experience is limited to 100 cases, this statement may be accepted with reserve.

Experimental studies following öophorectomy. Harold Bailey, from an experimental and clinical study of metabolic changes after double öophorectomy, finds the evidence somewhat inconclusive. On the whole the results show a reduction in oxygen intake and CO_2 output. He is in accord with the modern view that the menopause will ensue after öophorectomy unless a part at least of the endometrium is retained. This is also true in the case of ovarian transplantation. W. W. KING.

Surgery, Gynæcology and Obstetrics.

August, 1921.

ORIGINAL ARTICLES.

1. Early squamous-cell carcinoma of the cervix, accidentally discovered when the body of the uterus was being curetted for hæmorrhage caused by hyperplasia of the endometrium and by a small submucous myoma. THOMAS S. CULLEN.
2. *Rare tumours of the cervix of the uterus of inflammatory origin condyloma and granuloma. LAWRENCE R. WHARTON.
3. The X-ray after the inflation of the pelvic cavity with carbon dioxide as an aid to obstetric and gynæcological diagnosis. REUBEN PETERSEN.
4. *Radium in carcinoma of the uterus. WILLIAM KOHLMANN.
5. *The histological changes incident to radium and X-ray treatment of uterine carcinoma. O. FRANKL and I. AMREICH.

DEPARTMENT OF TECHNIQUE.

6. Control of chronic pain. FREDERICK G. DYAS.
7. The application of silver foil as a preventive of peritoneal adhesions. ARTHUR J. PULS.
8. Notes on the Hadra-Martin-Rawls operation for cystocele. THEODORE J. DOEDERLEIN.

Rare tumours of the cervix of the uterus of inflammatory origin—condyloma and granuloma. Wharton, commenting upon the rarity of condyloma of the cervix, states that only three cases of this disease have been seen in the Johns Hopkins Hospital during the last thirty years. Of the three, two

were gonorrhœal and one tuberculous. In one gonorrhœal case the lesion was of the classic textbook type, there being a single pedunculated condyloma, situated on the posterior lip of the cervix, accompanied by a cauliflower-like mass of condylomata acuminata which covered the external genitalia and perineum.

The other case, that of a negress, had a long-standing gonorrhœal infection, and was admitted as a tubo-ovarian abscess, chronic salpingitis, encysted pelvic peritonitis, and a massive granulomatous growth on the cervix. The tuberculous case was diagnosed only on microscopic examination.

Pathology. The cervical condylomata are covered by squamous or cylindrical epithelium, depending upon the portion of the cervix from which they arise, and possess a connective tissue core. The two cases of gonorrhœa showed no naked-eye ulceration, but under the microscope the squamous epithelium had been shed from the papillomata in the case of the negress, and they were covered by a thin layer of fibrin. The stroma of the papillomata presented an acute grade of inflammatory reaction. The single papilloma of the other case was covered by squamous epithelium and the connective tissue core showed only slight inflammatory reaction.

In the tuberculous case the cervix and its papillomata filled the upper third of the vagina. The papillomata were not friable and bled only slightly on manipulation. In neither case of gonorrhœa was there any evidence of endometritis, although one case had bilateral tubo-ovarian abscesses.

The treatment adopted in each gonorrhœal case was removal of the focus of infection, and destruction of the local growth by the cautery. In the tuberculous case, the cervical condition was secondary to extensive tubercular disease elsewhere, and complete eradication of the disease was impossible.

Careful application of the cautery is suggested as a palliative local measure.

Radium in carcinoma of the uterus. William Kohlmann here further discusses the relative merits of radium and operation in the treatment of carcinoma of the uterus, particularly carcinoma of the cervix. Radium is accepted as the treatment of choice in all inoperable cases, because it accomplishes more than any other treatment, without any great risk. The treatment of recurrent cases after panhysterectomy is said to be unsatisfactory. Out of 12 cases of this kind reported, 9 have probably died (5 of these being untraced), while 3 have been clinically well for $2\frac{1}{2}$ years.

When radium is used as a pre-operative measure, the operation should be carried out within four weeks, otherwise the tissue-changes have progressed to such a degree that operation is difficult.

It is conceded that no uniformity of opinion has yet been reached with regard to the question of substituting radium for operation in cases of early and frankly operable carcinoma. In a few of these cases where operation was contraindicated on account of other lesions, radium alone was used, with results in the highest degree satisfactory, except in one case, where after apparent cure, there was a sudden fulminating recurrence followed by death as a result of hæmorrhage.

Radium radiation is stated to be effective at a range of from 3 to 5 centimetres depending on the quantity and quality of the ray, and the radio-

sensibility of the surrounding tissue. Three or four days after radiation, the infiltration and tumefaction of the cervix are decreased; this is gradually followed by shrinking of the infiltration in the broad ligament.

The rays are stated to destroy the carcinoma cells, and promote an increase in the formation of connective tissue as a result of the destruction of the carcinoma cells.

Ligation of the internal iliacs and ovarian arteries before radiation is suggested as an adjuvant to the promotion of the formation of connective tissue.

Twelve cases are cited as being dealt with in this way, 5 died without any benefit, 6 showed primary cure, and one showed no improvement but was still living 10 months after treatment. Of the 6 primary cures, the longest period of health is 18 months, the shortest only 3 months, since the treatment.

Since June 1915, Kohlmann has treated 56 cases of proved carcinoma with radium only. With few exceptions all the cases showed improvement, and some improved to such an extent that a cure could be hoped for. Cases which did not improve after one or two treatments were not influenced after prolonged treatment. When recurrences took place after apparent primary cure, they were observed mostly at 6 to 9 months, and further treatment was without benefit. Of 22 cases living at the time this article was written, one had been well for 4 years, one for 3 years, two for 2 years, while the remainder had been under treatment less than 12 months. Almost all the cases were of an advanced type.

Either 25 or 50 milligrams of radium were employed, contained in silver tubes $1\frac{1}{2}$ millimetres thick, the whole being encased in a 3 millimetre brass filter, covered by a soft rubber finger-cot, tied at the end. The cot is placed in the cancer-crater for 12 hours and the vagina packed with gauze, to protect the rectum and bladder as far as possible. A second application is made in 8 to 10 days, 50 milligrams of radium in a celluloid capsule being introduced into the cervix; 50 milligrams or more into the still existing crater and the vagina packed with gauze.

The patient was asked to return in 4 or 6 weeks for examination. Where improvement was observed application was repeated. Where there was no improvement after the first treatment, repeated application was equally without success. More recently the duration of the primary application has been lengthened to 24 hours, and the treatment repeated in 6 weeks. The change is said to be more convenient to the patients and to give satisfactory results.

The histological changes incident to radium and X-ray treatment of uterine carcinoma. O. Frankl and I. Amreich, by a study of serial sections excised at different intervals from the crater and its edge in carcinoma of the uterus, endeavoured to ascertain at what time the action of radium or X-rays is greatest and at what distance the effect of radium or X-rays begins to decrease.

Fifty milligrams of radium were used in a platinum or brass filter covered by 1 cm. of cotton and rubber tissue. Five 12-hour treatments were given at intervals of 1 to 2 days.

For the X-rays, a symmetrical apparatus was used, raying at a focal distance of 22 cms., and giving a maximum dose of 18 Holzknecht units, filtering through 3 millimeters of brass, 0.5 millimeter of zinc, wood or

chamois four times as thick; 3 milliamperes, 11 Benoist, 40 minutes per field.

Eight to nine fields were covered, three or four in front, four on the back, and one in the perineum. In the first series the cervix was treated, in the second the parametrium, and in each eight or nine fields were covered. The second series was given after six weeks.

A full description is given of a case of carcinoma of the cervix treated by X-rays, and the following conclusions were reached:—

The areas directly exposed to the rays showed the first changes on the third and fourth days after treatment. The influence of the rays was greatest between the fifth and seventh days, and ceased at the fortieth day after the first treatment. Areas indirectly exposed were slower in showing the changes and the effect wore off sooner. Similar histological changes occur in X-ray and radium treatment. Œdema of the connective tissues was first noted, then enlargement and vacuolation of the carcinoma cells, followed by fragmentation with invasion of the carcinomatous area by lymphocytes. Carcinoma cells are said to respond more quickly to the action of X-rays than to radium, and the stage of enlargement of the carcinoma cells is not always noted in X-ray treatment. The authors recommend X-ray for treating the parametrium and the glands, and radium for the treatment of the carcinomatous crater in the cervix.

A. C. Palmer.

Gynécologie et Obstétrique.

Vol. 4, No. 1, 1921.

1. *Uterine hæmorrhage treated by radium (40 cases). Henri Pouey.
2. *The establishment of a dispensary for the treatment of syphilis attached to the Baudelocque clinic. A Couvelaire.
3. Research in therapeutic gynæcology based on anaphylactic shock. G. Bouche and A. Hustin.

Uterine hæmorrhage treated by radium (forty cases). Curettage of the uterus, even in those cases where the mucosa seems to be the cause of the hæmorrhage, is often a failure, and before proceeding to mutilating operations treatment by radium should be considered.

The usual dose is 100 milligrammes of radium for twenty-four hours; in three cases 200 milligrammes were used for ten hours, and in four cases 50 milligrammes were used for twenty-four hours.

A Dominici tube was always used, with a silver filter 1 or 2 mm. in thickness, covered with a tube of black rubber.

In most cases only one application was made, in some two, and very occasionally three: when several applications have been made, it has been at an interval of several months, to allow for a prolonged and sometimes late action of radium: in some cases X-rays have been used in addition.

If possible the treatment should not be in sufficient dosage to suppress menstruation, and it is thought that in selected cases the results are better than those of the surgeon.

Establishment of an antisyphilitic dispensary attached to the Baudelocque Clinic. Couvelaire points out that syphilis is one of the chief causes of death in the fœtus, the newborn and the suckling.

In 1920, of 55 cases of death of the fœtus during gestation after the

sixth month, syphilis was diagnosed with certainty in 24; in 84 premature weakly newborn dying before the tenth day, syphilis was diagnosed in 17 cases: it is of the greatest importance that syphilis should be treated both before and during gestation and after delivery.

Observations of death of the fœtus in utero from syphilis after the sixth month of gestation showed that in 233 cases syphilis was only clinically evident in 60 of the mothers, yet in many others syphilis was diagnosed from the Wassermann reaction and evidence of syphilis in the fœtus.

The treatment adopted for the women has been, as a general rule, intravenous injections of Novarsenobenzol in gradually increasing doses from 0.15 to 0.75 in series of seven weekly injections: for the children, mercurial inunction, intramuscular injections of Glucarsenobenzol, or sometimes subcutaneous injections of Sulfarsenol repeated every four or five days, gradually increasing from $\frac{1}{4}$ to 5 centigrammes (8 doses in all).

Couvelaire considers it most desirable that there should be similar organizations in all Maternity Hospitals. F. H. Lacey.

La Gynécologie.

20th year, *January*, 1921.

1. X-rays and radium for uterine fibroids. M. P. Petit-Dutaillis.
2. *On blood transfusion in puerperal sepsis. M. P. Delmas.
3. On the technique of radium therapy for cancer of the uterus. M. A. Betrix.

On blood transfusion in puerperal sepsis. P. Delmas, having observed the good results which followed the transfusion of blood in many cases of hæmorrhage and septicæmia during the war, suggests its use in certain cases of puerperal sepsis.

He records his observations on four cases where the usual methods adopted had failed. As regards the technique in these cases he advises, when possible, that the donor should be a convalescent patient whose blood has shown the same micro-organism, thus increasing the specific antibodies present. He also advocates the use of the donor's serum only, to avoid the difficulties of hæmolysis and agglutination.

The four cases described are as follows: (1) Patient, aged 26, post-partum hæmorrhage, artificial removal of placenta, severe infection. On the 12th day the temperature and pulse showing no sign of decrease, and the patient's anæmia being very marked, 300 cc. of citrated blood were transfused. The following day the temperature and pulse began to drop and within a week both were normal. (2) Forceps delivery. In spite of repeated intrauterine douches, the patient's condition on the 17th day was very serious; the transfusion of 300 cc. of blood taken from a healthy patient was followed by a progressive and uninterrupted recovery. (3) Hydramnios, premature rupture of membranes, internal version, infection. This case is not so demonstrative as the first two. The transfusion was done on the 9th day and two pyæmic abscesses in the buttock formed on the 11th and 16th days respectively, the temperature and pulse not returning to normal until the 20th day. (4) A three months' abortion,

retained placenta, severe infection. This case appears to be a failure, although the end-result was not known. The patient had two transfusions of blood on the 13th and 19th days respectively with only temporary improvement after the first. Unfortunately on the 23rd day the relations removed her from hospital.

In conclusion, Delmas points out that four cases do not allow one to form conclusions, but he believes them to be worthy of record if only to stimulate research in a subject where the powerlessness of the accoucheur is so evident.

20th year, *February*, 1921.

1. Uterine fibroids (red degeneration). MM. TEDENAT and TZELEPOGLOU.
2. *The transverse incision in gynæcology. M. V. PAUCHET.

The transverse incision in gynæcology. M. Pauchet states that he finds this incision is indicated in 50 per cent. of laparotomies done in his practice. He gives the disadvantages as follows:—(1) It causes more hæmorrhage than the median incision; this objection, however, can be overcome. (2) It prolongs the operation by 5-6 minutes. (3) In some cases it gives a poor exposure. (4) It does not allow of drainage.

Whereas the advantages are:—(1) It is invisible if made in the pubic hair or in one of the transverse abdominal folds. (2) The return to normal of the abdominal wall is more complete than after a vertical laparotomy. (3) The surgeon is less hampered by coils of intestine. (4) Post-operative hernia is avoided, as the wall is firmer than after any method of median suturing.

Pauchet does not recommend this incision in cases of pyosalpinx or large fibroids reaching above the umbilicus or for carcinoma of the uterus. He prefers spinal anæsthesia on account of the better muscular relaxation.

The main points of his technique are: (1) The skin incision; great care is necessary to secure complete hæmostasis. (2) Division of the aponeurosis should be the same length as the skin incision. (3) The separation of the aponeurosis from the rectus muscle should be done by means of gauze and not with scissors except of course along the linea alba. The aponeurosis should not be separated from the subcutaneous tissue in order to avoid damaging the blood supply of the former. (4) Separation of the recti muscles in the middle line. (5) Median incision of the peritoneum. (6) Closure of the wound in layers with simple catgut.

20th year, *March*, 1921.

1. Presentation to M. DOLERIS.
2. The action of sunrays after operations for tuberculosis of the genital organs.

20th year, *April*, 1921.

1. *Treatment of genital prolapse in elderly women by complete colporrhaphy, preserving the uterus. G. JACOB.
2. Partial symphysiotomy as a method of treatment for contracted pelvis. Prof. ROMOLO COSTA.

Treatment of genital prolapse in elderly women by complete colporrhaphy, preserving the uterus. G. Jacob recommends the operation for prolapse devised by M. Savariaud who modified that of the Swiss surgeon P. Muller.

The operation is indicated in elderly females well past the menopause and where the sexual functions are of minor importance.

He enters into the pathology of the prolapse, and believes the local factors to be of minor importance in its causation compared with the patient's general nutrition. These are usually fat, constipated, and suffer from visceroptosis, dyspepsia, etc., increased by former pregnancies. Of the local factors the integrity of the perineum is important but must not be exaggerated, as women with an intact perineum may also have a complete prolapse, and on the contrary there may be no trace of prolapse even when the perineum has completely gone.

The most important element is the relaxation of the vaginal walls which is constant, and is the beginning of the trouble. It follows that any operation devised to suspend the uterus only must fail to cure the prolapse.

Jacob lays great stress on the necessity of pre-operative rest in bed—varying from 2-4 weeks according to the local condition present, as in most cases the cervix is congested, irreducible, and ulcerated. During this time the patient's general condition can be improved and the prolpase treated with fomentations and antiseptics.

The operation he describes, devised by Savariaud, differs from that of Muller in two important points: (1) The preservation of a small portion of the vagina. (2) Adding to the colporrhaphy a perineorrhaphy.

The steps of the operation are as follows: (1) The patient is placed in the lithotomy position, and the vaginal mucous membrane well disinfected. (2) The cervix is held with a pair of volsellum forceps and pulled out as far as possible; should there be any suspicion of metritis, which is exceptional, the uterus is curetted first. (3) Next the mucous membrane covering the prolapse must be dissected off, by marking out with a knife a circular incision at the base of the prolapse. From the centre of this incision in front and behind longitudinal median incisions are made as far as the cervix which is also encircled by a second circular incision. The four areas mapped out are then dissected off; this may be done with gauze for preference, or if very adherent and sclerosed with scissors. The hæmorrhage is slight and is easily arrested with hot saline. There is no trouble with the bladder or peritoneum provided the mucous membrane only is removed. On reaching the cervix, which is atrophic as a rule, the mucous membrane is encircled by an incision, but should it be hypertrophied it must be amputated. (4) The next stage consists in reducing the prolapsed vagina into the pelvis by a series of pursestring sutures. The cervix is closed by a catgut suture and the first pursestring is passed a good centimetre higher up. This suture is usually repeated twice, each one being about 1 cm. above the last, but four or five pursestrings may be necessary to reduce the prolapse completely. Each suture is tied in turn beginning at the cervix until the prolapse disappears. (5) The last stage consists in bringing together in the middle line the cut edges of the vaginal mucous membrane by means of interrupted catgut stitches. By this means the relaxed and prolapsed vagina is converted into a small *cul de sac*, 2-3 cms. in depth, in which should be left a small drain which is fixed with a catgut stitch behind and can be removed on the fourth day.

The whole operation should not take longer than thirty minutes. Savariaud advises a perineorrhaphy to complete the operation.

HILDA N. SHUFFLEBOTHAM.

Bulletin de la Soc. d'Obstétrique et de Gynécologie de Paris, &c.

No. 5, 1920.

SOCIETY OF OBSTETRICS AND GYNÆCOLOGY OF PARIS.

MEETING, *Nov.* 8, 1920.

1. Some cases of prolapse of cord, in which all pulsations had ceased, but terminating in live children. M. SAMUEL BERMANN.
2. *The obstetrical after-history of women who have had one or more Cæsarean sections. M. COUVELAIRE.
3. *Puerperal pyæmia. Ligature of thrombosed veins. Cure. MM. LEQUEUX and CHOME.
4. Persistent vomiting in a woman six months' pregnant, due to a cerebellar tumour. MM. VAUDESCAL and HEUYER.
5. Radiographic pelvimetry, with the help of a Mazo's "Anti-diffuser." M. J. L. CHIRIE.

Multiple Cæsarean section. Dr. Couvelaire and Dr. Morrison Lacombe collected fifty cases of women who had had one or more Cæsarean sections. Twenty-eight of these were from the Baudelocque clinic. The authors state that during the last ten years the technique has so much improved that weak abdominal scars, adhesions of uterus to abdominal wall or other organs, is practically unknown. The uterine scar is often most satisfactory. As a rule, if the uterus is examined after extraction of the child the old scar is scarcely perceptible. Sometimes, however, the scar is fibrous and thinned, being reduced to a layer of peritoneum lined by mucous membrane, sometimes normal, sometimes atrophied. In 75 per cent. of cases the cicatricial zone has sufficient thickness to withstand subsequent pregnancies and labours; and even in the cases where there is very marked thinning of the scar (less than 1 per cent. of the normal thickness), normal pregnancy and labour have been recorded. It is very difficult to judge the strength of a uterine scar, and the only way to be certain is to explore the uterus and palpate it from inside, either at a subsequent Cæsarean section or after a normal labour. Pregnancy is not interfered with, abortions are rare, and premature labour is not more frequent than usual among hospital cases. It might appear that Cæsarean section causes sterility, but statistics show that this is voluntary, and not due to operation. Rupture of the uterus is rare—2 cases—and is due to a weak uterine scar. Out of 41 cases who had had previous section, four had weak scars, and two of these ruptured. All women who have had Cæsarean section run the risk of ruptured uterus during the last three months of subsequent pregnancies, and therefore should be kept under observation in a favourable place for immediate surgical interference.

Puerperal pyæmia. The following case was reported by MM. Lequeux and Chomé (Society of Obstetrics and Gynæcology of Paris, 1920, No. 5).

The patient had natural delivery of a living child on 28th July, 1920. She was brought to the Tarnier clinic on the fifth day for puerperal infection. She was a primigravida, 27 years of age. Family history was of no importance. Past history showed that she had had scarlet fever

when ten years old, and salpingitis when she was twenty-five. There was nothing abnormal during the pregnancy or labour. On admission her temperature was 40.5 C., pulse 108, but general condition seemed good. Lochia profuse and offensive, uterus subinvoluted and tender. Exploration of uterus showed fragments of decidua and membranes. Patient was given an injection of antistrept. vaccine. Two hours later she had a rigor lasting half an hour; temp. 40.2 C. On August 4th, patient again had a rigor, tempt. 41 C., pulse 120. Fixation abscess tried. From this time onwards the patient had rigors every day; but in spite of this, and in spite of a thready pulse, the general condition remained good. Blood cultures were negative, but streptococci were found in the cervix.

On August 25th she complained of pain in the right side of the thorax, and her general condition was not so good. On August 27th patient complained of pain in the left iliac fossa. The uterus was still subinvoluted, and a diagnosis of utero-pelvic phlebitis was made. On September 3rd, *i.e.*, 35 days after the confinement, a laparotomy was performed. The internal iliac veins were ligatured at the angle of arterial bifurcation. The ovarian vessels were then dissected out, and the veins found to be much thrombosed nearly to the level of the kidneys. The vessels were then ligatured as far away from the thrombosis as possible. The abdomen was drained. Ether was used as an anæsthetic. The following day the patient's general condition was good, and pulse and temperature had a tendency to diminish. Sept. 10th, patient had some vomiting. On Sept. 13th the drainage was removed, but suppuration was still profuse, so the wound was irrigated with Dakin's solution. From this time the patient began to improve, and on October 10th was allowed to get up.

Finally, the authors conclude that the following points justify operation in such cases:—

(1) Where the thrombo-phlebitis is not accompanied by extra-vascular lesions.

(2) Where localization of the thrombosis to the veins of the pelvis allows ligation on the distal side, *i.e.*, in the healthy part of the venous system.

MALCOLM DONALDSON.

Zentralblatt f. Gynäkologie.

No. 18, *May* 7, 1921.

1. *Does malignancy of cancer of the uterus increase during pregnancy? A. MAYER.
2. *Spontaneous rupture of the uterus due to eccentric implantation of the ovum, a case of pregnancy in a diverticulum. M. MULLER.
3. *Transplants of peritoneum. H. FUCHS.
4. Diagnostic use of taking swabs from the vagina. F. LEHMANN.
5. "Siccostypt" in gynæcological practice. G. ABEL.

New Books Reviewed—

Lemke—On puberty.

Synopsis of Recent Literature—

Five reviews on (α) Psychiatry, (β) Neurology.

Cancer of the uterus and pregnancy. Mayer reviews former and recent opinions on the subject of whether pregnancy has any influence on the rate of growth of cervical cancer, and produces much letterpress and four tables of figures. Finally, in his conclusion, he leaves the discussion much as it was: "I will not yet maintain that pregnancy definitely limits the spread of cancer, but on the other hand the opposite view is by no means definitely proven."

Spontaneous rupture of the uterus due to eccentric implantation of the ovum, a case of pregnancy in a diverticulum. Muller describes an interesting case of spontaneous rupture of the uterus due to the implantation of the ovum in the right cornu.

A primipara of 21 was sent into hospital with the signs of ruptured ectopic gestation. Naked-eye and microscopic examination of the uterus after supravaginal amputation showed that the 22 cm. fœtus lay not interstitially in the wall but in the right horn of the uterus, where the wall was thinned and had ruptured posteriorly. Muller claims this to be a case of pregnancy in a diverticulum of the uterus, and quotes seven other established cases from the literature.

Transplants of peritoneum. Fuchs uses "transplants" of peritoneum from where it lies loosely over the bladder to cover raw areas in the gut and parietal peritoneum left after removing pyosalpinges embedded in adhesions. He discusses the use of peritoneum from a hernial sac for a similar purpose, but prefers the fresh living transplant. He has not yet had an opportunity of seeing at autopsies what happens to his grafts.

No. 19, *May* 14, 1921.

1. *Case of diffuse placenta. R. Kapferer.
2. Remarks on iso-agglutination. K. Landsteiner.
3. A successful operation for recto-vesical and recto-vaginal fistula. H. Schmidt.
4. *Treatment of an extra-vesical orifice of the ureter. E. Puppel.
5. Transperitoneal closure of a vesico-vaginal fistula of difficult approach. U. v. Klein.
6. *Vesical calculus as an obstruction to birth. H. Ebbinghaus.
7. Two cases of cancer of cervix uteri. G. Seiss.
8. *Treatment of puerperal sepsis with turpentine. A. Hermstein.
9. *Turpentine injections in diseases of appendages. C. Hartog.
10. *Treatment of adnexa diseases with turpentine or caseosan. J. Sonnenfeld.
11. Symphysiotomy or Cæsarean section? F. Engelmann.

Cæsarean section.—Reviews of six articles.

Case of diffuse placenta. Kapferer describes a case of placenta prævia in a iii-para aged 40, in which the chorion was covered entirely with villi.

After preservation the membranes measured 40×36 cm. in their shrunken condition.

The thickness varied from 1.75 cm. on anterior and posterior walls to 2 mm. at the lower pole.

The cord insertion was exactly opposite the tear in the membranes. The patient was seven months' pregnant. Kapferer claims one other case has been described.

Treatment of an extra-vesical orifice of the ureter. Puppel describes a case where the right ureter, not a supernumary one, opened into the vagina close to the vaginal portion of the cervix. Cystoscopy proved the absence of the right ureter opening from the bladder. The aberrant ureter was grafted into the bladder by a vaginal operation.

Vesical calculus as an obstruction to birth. A woman whose first labour had been normal was sent into hospital late in the second stage with obstruction due to a tumour on the posterior surface of the symphysis. This was thought to be an exostosis or an osteoma, the size of a walnut. It was decided to remove the tumour by the vagina, and it proved to be a stone, 6×4.4 cm., lying in the bladder. The woman had had one normal labour two years previously.

Treatment of diseases with turpentine or caseosan. Turpentine is now being tried as a panacea for many gynæcological ills. Hermstein, using 1 cc. of a 20 per cent. solution in olive oil, has given sub-periosteal injections in cases of puerperal sepsis.

Twenty-four out of the thirty cases had sepsis in severe form. Of these 24, fifteen died. Of the remaining nine, in four cases the temperature came down suddenly on the second day, in three the temperature, despite 2-3 injections, showed no immediate change. In two the improvement could not be definitely ascribed to the injection. Six cases out of the thirty had a localised pelvic exudate, and the effect of the turpentine was undetermined. There is no remark that a bacteriological examination had been made in any of the cases.

Sonnenfeld claims that injections of turpentine oil deserve first place in the conservative treatment of cases of inflammation of the adnexa. The advantages are: (1) simplicity of technique; (2) minimum of annoyance to patient; (3) rapidity of cure. He gives injections every other day to women while they carry on their work. The dose and site of injection are not mentioned. Caseosan has no advantage over turpentine.

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1. Fourth manipulation in the external examination of pregnant women. H. Fuchs.
2. *Cæsarean section on account of fever. D. Koerting.
3. Dry birth with absence of both fœtal kidneys. D. Huzeler.
4. Discussion on congenital aplasia of the skin. E. Graf.
5. Congenital atresia of the ileum. E. Levy.
6. Skin sutures. E. Opitz.

Biology and internal secretion.—6 Reviews.

Cæsarean section on account of fever. Koerting describes two cases in which he performed Cæsarean section on account of rising temperature during the second stage. Both were primiparæ, with slight contraction of the pelvis, through which the head could have been born. In the first case the temperature rose to 38° C., and a small amount of albumen and blood was present in the urine. Membranes were unruptured.

In the second case the temperature had risen to 39.4° C., albumen was present in a large amount, and high forceps had been unsuccessfully tried. From the peritoneal fluid colonies of a gram positive non-hæmolysing streptococcus were obtained, from which he deduces a peritonitis was beginning

In both, living children were obtained, and the puerperium was uneventful G. G. ALDERSON.